Diaphragm Valves

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Atomic Layer Deposition Diaphragm Valves

ALD Series

Introduction

Atomic Layer Deposition (ALD) is a technique that deposits materials in the form of one atomic layer at a time on the substrate surface. FITOK ALD Series Atomic Layer Deposition Diaphragm Valves are ideal for the ALD process, delivering precise doses of gas during semiconductor chip manufacturing. These valves ensure the uniform gas deposition required for advanced technology.

Features

- ◎ Ultra long cycle life
- ◎ No dead space in the flow path
- ◎ High Cv consistency and stability
- ◎ Quick response to offer a total opening / closing response time of less than 15 ms
- ◎ Standard and thermal types optional, the thermal type has a working temperature up to 392 °F (200 °C)
- ◎ For the valve fitted with a solenoid valve, the solenoid valve is circularly rotatable along the actuator for easy position adjustment

Technical Data

Port Size		1/4" to 3/8", 6 mm to 8 mm or 1.125" to 1.5"	3/8" to 1/2", 10 mm to 12 mm or 1.5"
Flow Coefficient (Cv)		0.27①	0.62①
Orifice Size		0.16" (4.1 mm)	0.23" (5.9 mm)
Working Pressure		Vacuum to 145 psig (10 bar)	
Actuator Operating Pressure		60 ~ 90 psig (4.2 ~ 6.2 bar)	
Temperature	**Body**	Standard model: 32 ~ 248 °F (0 ~ 120 °C)	
		Thermal model: 32 ~ 392 °F (0 ~ 200 °C)	
	Actuator	32 ~ 248 °F (0 ~ 120 °C)	
	Solenoid Valve	-0.4 ~ 122 °F (-18 ~ 50 °C)	
	Sensor	-13 ~ 158 °F (-25 ~ 70 °C)	
Leak Rate (Helium)	**Internal**	$\leqslant 1\times10^{-9}$ std cm^3/s	$\leqslant 1\times10^{-8}$std cm^3/s
	External	$\leqslant 1\times10^{-9}$ std cm^3/s	$\leqslant 1\times10^{-9}$std cm^3/s

① The shown Cv is at normal temperature and is adjustable before shipment.
Cv may fluctuate due to temperature variations. For more details, please contact FITOK.

Flow Data

Air @ 70 °F (21 °C) Water @ 60 °F (16 °C)

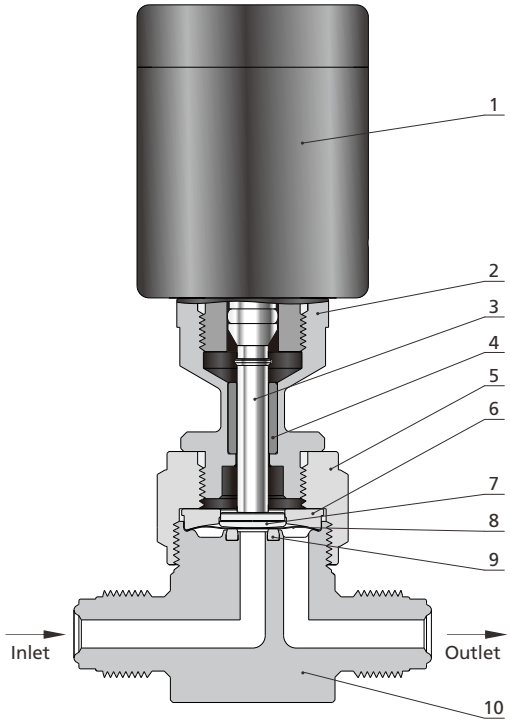
Orifice Size in. (mm)	Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
0.16 (4.1)	10 (0.68)	86	3.2
	50 (3.4)	230	7.2
	100 (6.8)	410	10.2
0.23 (5.9)	10 (0.68)	199	7.4
	50 (3.4)	530	16.6
	100 (6.8)	945	23.6

Process Specification

Item \ Process Specification	Ultra High Purity Process (FC-03)
Material	316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 5 µin. (0.13 µm)
Polishing Process	Electropolished
Cleaning	Ultra high purity cleaning in continuously monitored ultrasonic cleaning system with deionized water
Assembly Environment	ISO Class 4 (FS 209E Class 10 equivalent) cleanroom
Packaging	Double bagged in cleanroom

Notes: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction



Normally Closed Thermal Actuator

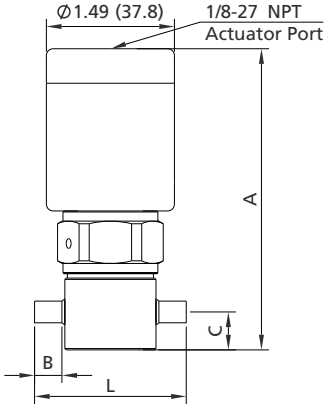
Item	Component	Material/Specification
1	Actuator	Aluminum
2	Thermal Isolation Coupling Housing (Thermal Model Only)	316 SS/ASTM A479
3	Thermal Isolation Coupling Stem (Thermal Model Only)	S17400/ASTM A564
4	Guide (Thermal Model Only)	PTFE/ASTM D1710
5	Bonnet Nut	316 SS/ASTM A479
6	Bonnet	S17400/ASTM A564
7	Button	316 SS/ASTM A479
8	Diaphragm	Cobalt Alloy/AMS 5876
9	Seat	PFA/ASTM D3307
10	Body	316L SS or 316L SS VAR

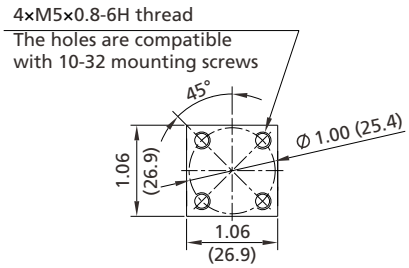
Dimensions and Ordering Information

Dimensions, in inches (millimeters), are for reference only.

2-Port Valves

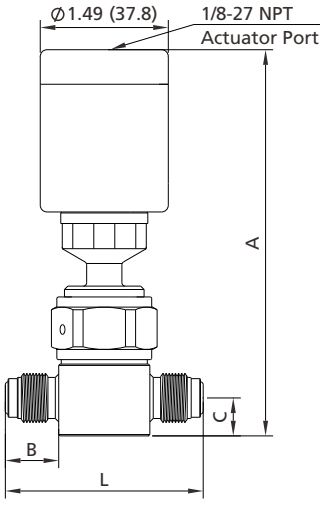
Standard Model

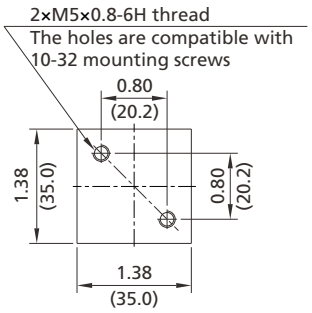




Orifice 0. 16 in. (4.1 mm) Bottom

Thermal Model



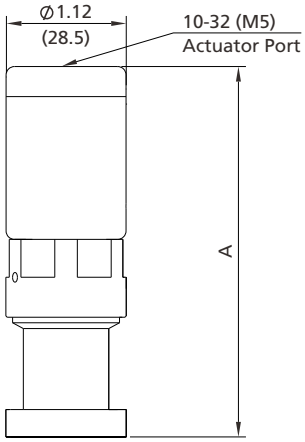


Orifice 0. 23 in. (5.9 mm) Bottom

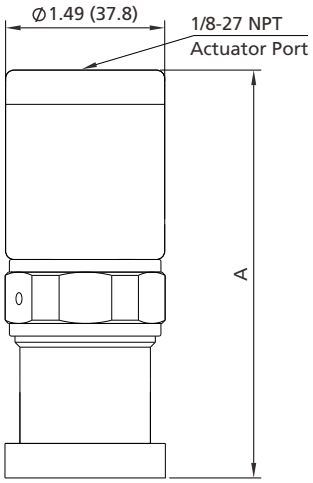
Orifice Size in. (mm)	Cv	Valve Type	Basic Ordering Number	Connection Type and Size	Dimensions, in. (mm)			
					A	B	C	L
0.16 (4.1)	0.27	Standard	ALD□□-TB4-4-	1/4"×0.035" Tube Butt Weld	3.50 (88.9)	0.30 (7.6)	0.44 (11.2)	1.74 (44.2)
			ALD□□-TB6-4-	3/8"×0.035" Tube Butt Weld		0.26 (6.6)		
			ALD□□-FFR4-4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting		0.86 (21.8)		2.78 (70.6)
			ALD□□-RFR4-4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting				
			ALD□□-FR4-4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting		0.62 (15.7)		2.30 (58.4)
		Thermal	ALD□□-TB4-4-HT-	1/4"×0.035" Tube Butt Weld	4.50 (114.0)	0.30 (7.6)	0.44 (11.2)	1.74 (44.2)
			ALD□□-TB6-4-HT-	3/8"×0.035" Tube Butt Weld		0.26 (6.6)		
			ALD□□-FFR4-4-HT-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting		0.86 (21.8)		2.78 (70.6)
			ALD□□-RFR4-4-HT-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting				
			ALD□□-FR4-4-HT-	1/4" Integral Male FR Metal Gasket Face Seal Fitting		0.62 (15.7)		2.30 (58.4)
0.23 (5.9)	0.62	Standard	ALD□□-TB6-6-	3/8"×0.035" Tube Butt Weld	3.66 (93)	0.67 (17.0)	0.50 (12.7)	2.72 (69.0)
			ALD□□-TB8-6-	1/2"×0.049" Tube Butt Weld				
			ALD□□-FFR8-6-	1/2" Rotatable Female FR Metal Gasket Face Seal Fitting		0.94 (24.0)		3.27 (83.0)
			ALD□□-RFR8-6-	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting				
			ALD□□-FR8-6-	1/2" Integral Male FR Metal Gasket Face Seal Fitting		0.81 (20.6)		3.00 (76.2)
		Thermal	ALD□□-TB6-6-HT-	3/8"×0.035" Tube Butt Weld	4.65 (118.1)	0.67 (17.0)	0.50 (12.7)	2.72 (69.0)
			ALD□□-TB8-6-HT-	1/2"×0.049" Tube Butt Weld				
			ALD□□-FFR8-6-HT-	1/2" Rotatable Female FR Metal Gasket Face Seal Fitting		0.94 (24.0)		3.27 (83.0)
			ALD□□-RFR8-6-HT-	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting				4.06 (103.0)
			ALD□□-FR8-6-HT-	1/2" Integral Male FR Metal Gasket Face Seal Fitting		0.81 (20.6)		3.00 (76.2)

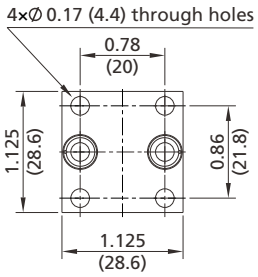
Modular Surface-Mount Valves

1.125" Surface-Mount

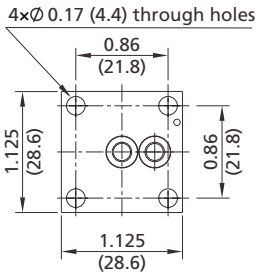


1.5" Surface-Mount

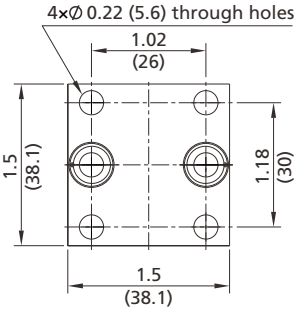




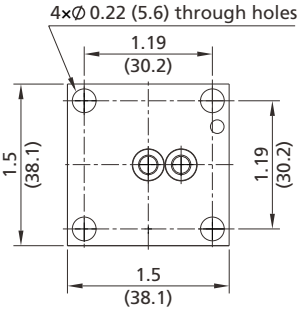
1.125" W-Seal Bottom



1.125" C-Seal Bottom



1.5" W-Seal Bottom

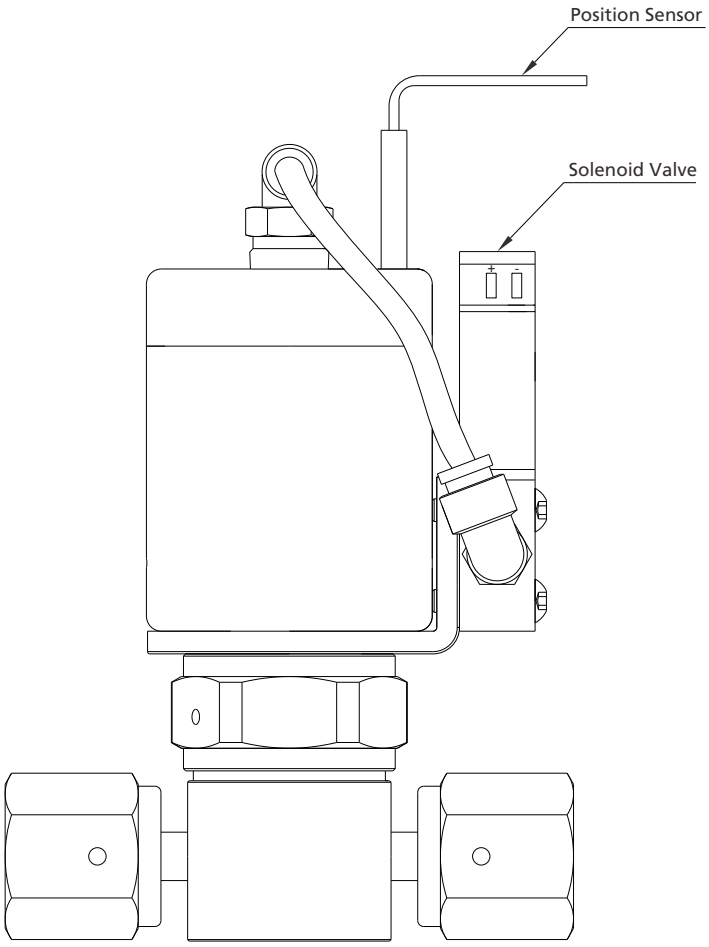


1.5" C-Seal Bottom

Orifice Size in. (mm)	Cv	Valve Type	Basic Ordering Number	Connection Type and Size	Dimension, in. (mm)
					A
0.16 (4.1)	0.27	Standard	ALD□□-WS11-4-	1.125" W-Seal	3.40 (86.4)
			ALD□□-CS11-4-	1.125" C-Seal	
			ALD□□-WS15-4-	1.5" W-Seal	3.70 (94.0)
			ALD□□-CS15-4-	1.5" C-Seal	
		Thermal	ALD□□-WS11-4-HT-	1.125" W-Seal	4.39 (111.5)
			ALD□□-CS11-4-HT-	1.125" C-Seal	
			ALD□□-WS15-4-HT-	1.5" W-Seal	4.69 (119.1)
			ALD□□-CS15-4-HT-	1.5" C-Seal	
0.23 (5.9)	0.62	Standard	ALD□□-CS15-HF-6-	1.5" C-Seal (High Flow)	3.81 (96.9)
		Thermal	ALD□□-CS15-HF-6-HT-	1.5" C-Seal (High Flow)	4.80 (122.0)

Options and Accessories

Position sensors and solenoid valves are optional. Valve bodies can be equipped with heater cartridge and thermocouple holes.



Normally Closed Standard Actuator

Position Sensors

Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

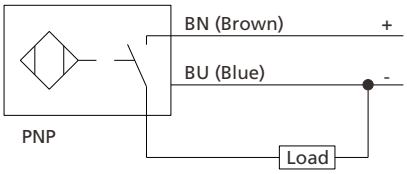
Notes: 1. Not applicable to modular surface-mount valves in 1.125".
2. Position sensors are only applicable to normally closed pneumatically actuated valves. For normally open pneumatically actuated valves with position sensors, please contact FITOK.

Technical Information

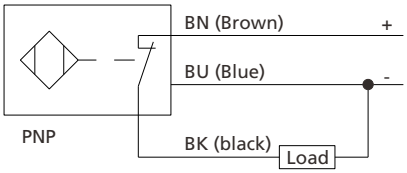
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Operating Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally Open Position Sensor



Normally Closed Position Sensor



Note: For normally closed pneumatic actuator valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open.
Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.

Solenoid Valve Assemblies

With fast-acting and high-flow features, the solenoid valve reduces overall response time. The solenoid valve assembly includes tubing, fittings, and a rotatable mounting bracket, offering flexibility for adjusting the solenoid valve position.

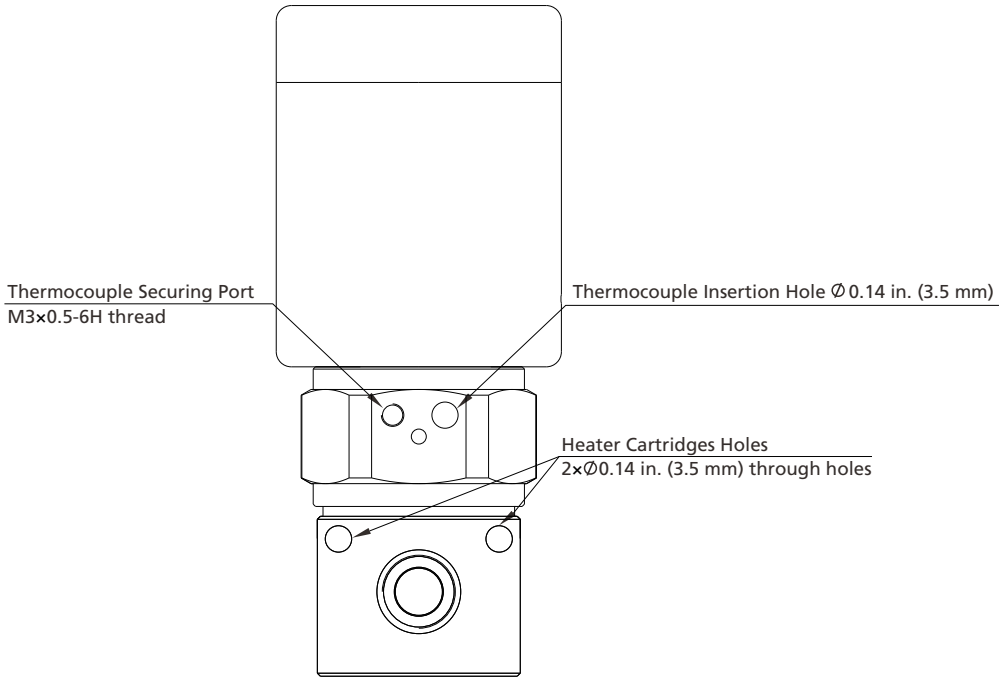
Technical Information

Solenoid Valve	**Voltage/Power**	24 V (dc)/4.0 W
	Temperature Range	-0.4 ~ 122 °F (-18 ~ 50 °C)
	Port	M5×0.8-6H thread, compatible with 10-32 screws
Fitting	**Material**	316 SS
Tubing		Polyurethane
Bracket		304 SS
O-Ring		Fluorocarbon FKM

Heater Cartridge and Thermocouple Insertion Hole

Not applicable to modular surface-mount valves.

Heater cartridges holes: 2-port valves have 2 Holes, 3-port valves have 1 Hole.
Thermocouple Insertion Hole: 2-port and 3-port valves have 1 Thermocouple Insertion Hole and 1 Thermocouple Securing Port.



Normally Closed Standard Actuator

Part Number Description

ALD6LV - FR4 - 4 - HT - 3P - CF3MOVBC

Body Material	
6L	316L SS
6LV	316L SS VAR

Port Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
WS	W-Seal
CS	C-Seal

Port Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm or 1/2"×0.049"
10	10 mm
12	12 mm
11	1.125"
15	1.5"
15-HF	1.5" High Flow

Orifice Size	
4	0.16" (4.1 mm)
6	0.23" (5.9 mm)

Valve Type	
	Standard
HT	Thermal

Ports	
	2-Port
3P	3-Port

Actuator Type	
C	Normally Closed
O	Normally Open

Process Specification	
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Note: MO and MC sensors are only applicable to normally closed pneumatically actuated valves.

Accessory	
	None
V	Solenoid Valve Assembly

Heater Cartridge Holes and Thermocouple Holes	
	None
BC	Heater Cartridge Holes and Thermocouple Holes

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available;
Should you have any questions, please contact FITOK Group or our authorized distributors.

Low Pressure Manual Diaphragm Valves
DQ Series

Introduction

DQ Series Low Pressure Manual Diaphragm Valves are suitable for high purity and ultra high purity applications. These valves offer enhanced reliability, a wide temperature range, and excellent medium compatibility, making them applicable to a vast majority of working conditions.

Features

◎ Low internal volume, fully swept flow path
◎ Contained seat to provide excellent resistance to swelling and contamination
◎ Cobalt alloy diaphragm with high strength and corrosion resistance to ensure long cycle life
◎ Different handle types available

Technical Data

Port Size		1/4" to 3/8" or 6 mm to 8 mm
Flow Coefficient (Cv)		0.27
Orifice Size		0.16 in. (4.1 mm)
Max. Working Pressure		250 psig (17.2 bar)
Temperature		PCTFE: -10 ~ 176 °F (-23 ~ 80 °C) PFA: -10 ~ 302 °F (-23 ~ 150 °C)
Leak Rate (Helium)	**Internal**	⩽1×10^{-9} std cm^3/s
	External	⩽1×10^{-9} std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

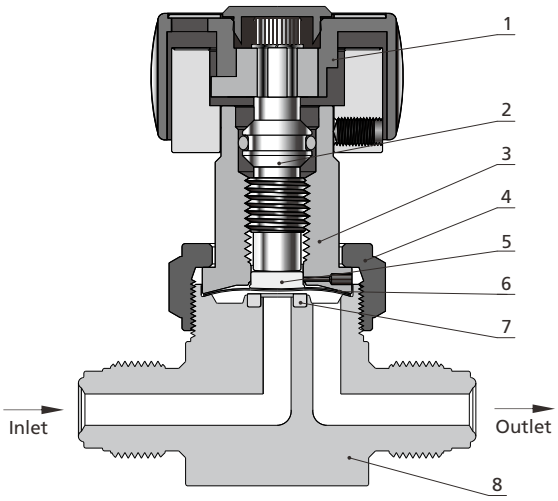
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	86	3.2
50 (3.4)	230	7.2
100 (6.8)	410	10.2

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)		Ultra High Purity Process (FC-03)
Material	316L SS		316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 10 µin. (0.25 µm)	Ra 5 µin. (0.13 µm)①	Ra 5 µin. (0.13 µm)
Polishing Process	Machine finished	Electropolished	Electropolished

Notes: Refer to page P-01 for a detailed description of Process Specification.
① Wetted surface roughness of valves with FR Series metal gasket face seal connections and tube butt weld connections.

Major Materials of Construction



Round Handle Model

Item	Component		Material/Specification
1	Handle	Round	ABS
		Integral Lockout	Aluminum
2	Stem		316 SS/ASTM A479
3	Bonnet		S17400/ASTM A564
4	Bonnet Nut		316 SS/ASTM A479
5	Button		316 SS/ASTM A479
6	Diaphragm (2)		Cobalt Alloy/AMS 5876
7	Seat		PCTFE/ASTM D1430 or PFA/ASTM D3307
8	Body		316L SS or 316L SS VAR

Handles

Manual-Round Handle

◎ Quick, quarter-turn actuation
◎ Handle with window to visually indicate open and closed states

OPEN

CLOSED

Manual-Integral Lockout Handle

◎ Quick, quarter-turn actuation
◎ Lockable in the closed position for safety

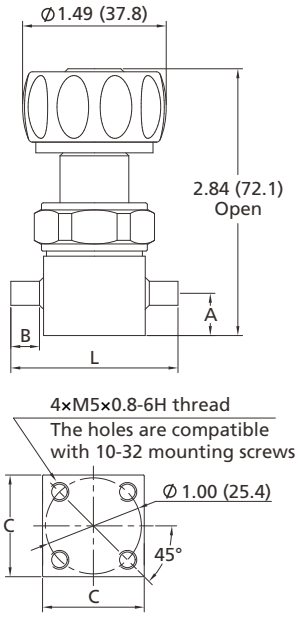
Dimensions and Ordering Information

Straight Type

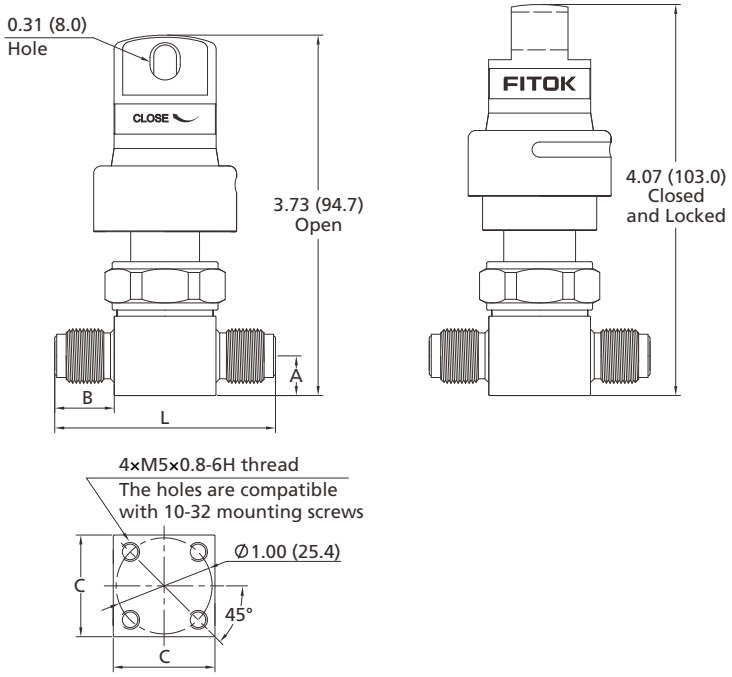
Dimensions

Dimensions, in inches (millimeters), are for reference only.

Round Handle



Integral Lockout Handle



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
DQ□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	1.74 (44.2)
DQ□□-TB6-	3/8"×0.035" Tube Butt Weld	0.44 (11.2)	0.26 (6.6)	1.06 (26.9)	1.74 (44.2)
DQ□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DQ□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DQ□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.62 (15.7)	1.06 (26.9)	2.30 (58.4)

Ordering Number Description

DQ6L – TB4 – FR4 – RAF2

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting

Inlet Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm

Outlet Type / Outlet Size	
	Same as Inlet
	Specified in the same way as Inlet

Handle Type	
R	Manual-Round Handle
U	Manual-Integral Lockout Handle

Seat	
	PCTFE
A	PFA

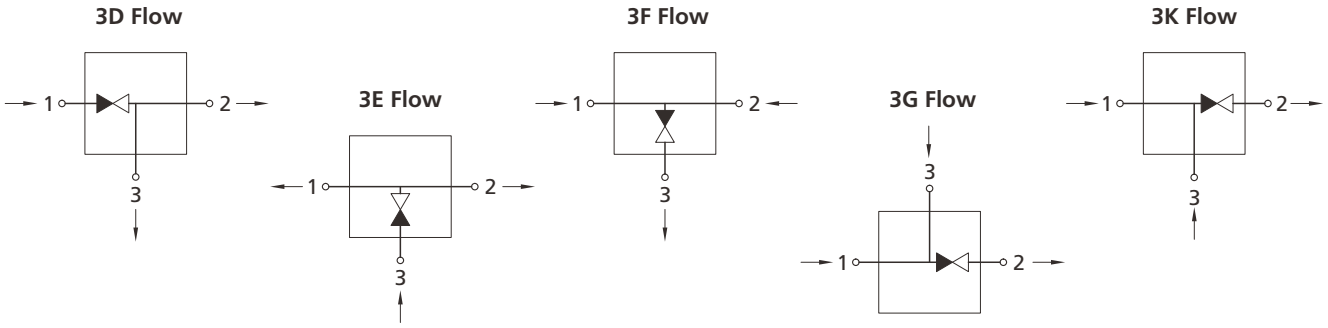
Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combinations are available.; Should you have any questions, please contact FITOK Group or our authorized distributors.

Branch Type

Flow Paths

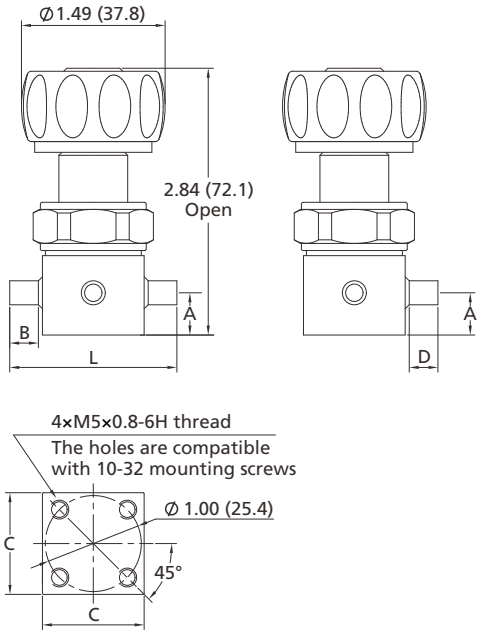
◎ Flow paths as viewed from the top



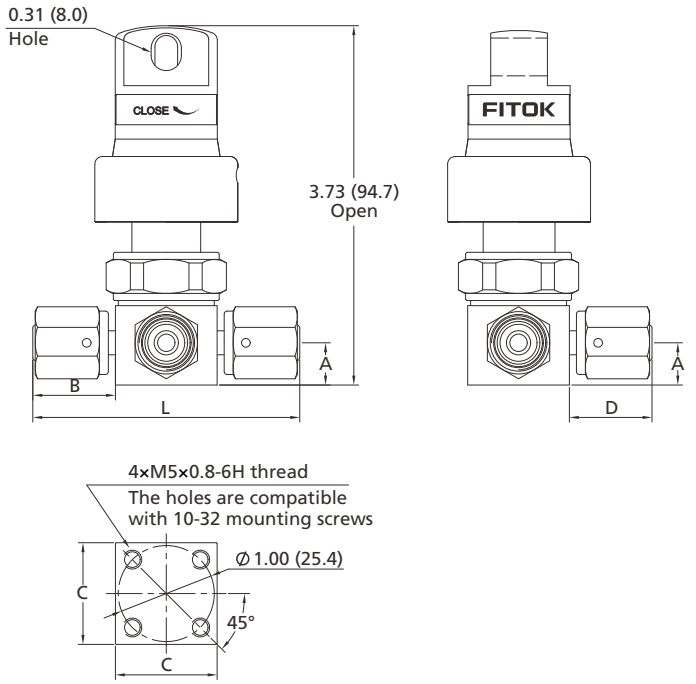
Dimensions

Dimensions, in inches (millimeters), are for reference only.

Round Handle



Integral Lockout Handle



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	C	D	L
DQ□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	0.30 (7.6)	1.74 (44.2)
DQ□□-TB6-	3/8"×0.035" Tube Butt Weld	0.44 (11.2)	0.26 (6.6)	1.06 (26.9)	0.26 (6.6)	1.74 (44.2)
DQ□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	0.86 (21.8)	2.78 (70.6)
DQ□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	0.86 (21.8)	2.78 (70.6)
DQ□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.62 (15.7)	1.06 (26.9)	0.62 (15.7)	2.30 (58.4)

Ordering Number Description

DQ6L – TB4 – FR4 – FFR4 – 3G – RAF2

Body Material	
6L	316L SS
6LV	316L SS VAR

Port 1 Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting

Port 2/3 Type / Port 2/3 Size	
	Same as Port 1
Specified in the same way as Port 1	

Port 1 Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm

Flow Path
3D
3E
3F
3G
3K

Handle Type	
R	Manual-Round Handle
U	Manual-Integral Lockout Handle

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

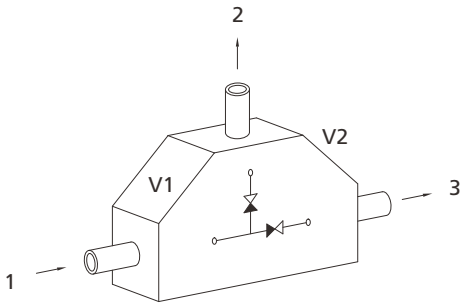
Seat	
	PCTFE
A	PFA

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
Should you have any questions, please contact FITOK Group or our authorized distributors.

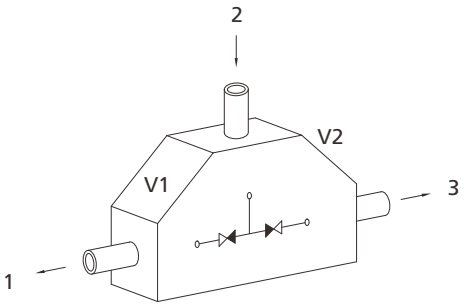
2-Valve 3-Way Block Type

Flow Paths

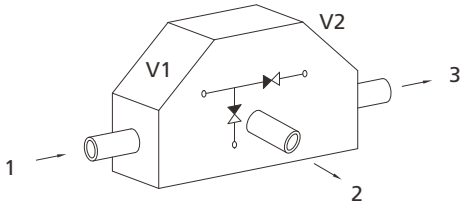
VT Flow



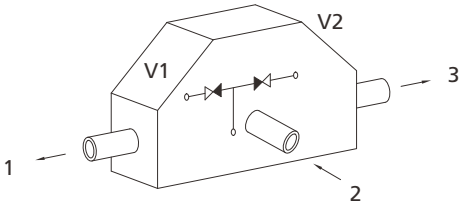
WT Flow



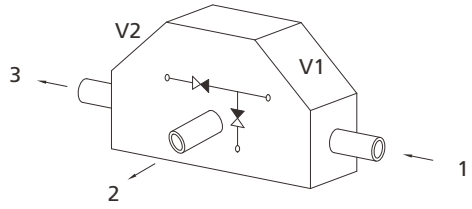
VF Flow



WF Flow

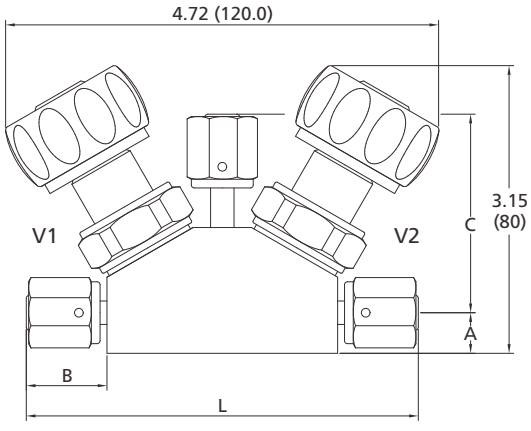


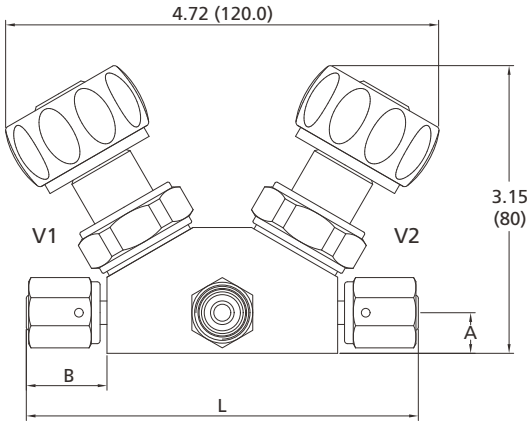
VB Flow

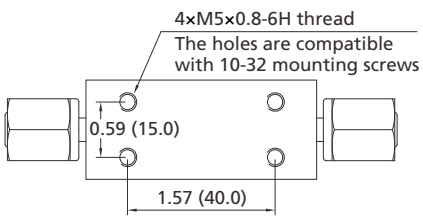


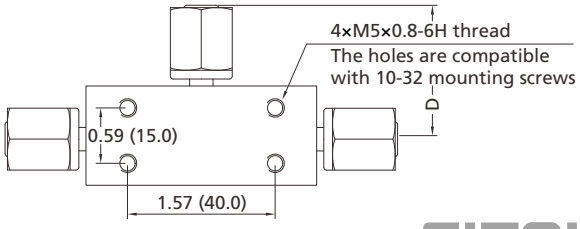
Dimensions

Dimensions, in inches (millimeters), are for reference only.









FITOK

Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	C	D	L
DQ23□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	2.12 (53.8)	—	4.24 (107.6)
DQ23□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	—	1.37 (34.8)	4.24 (107.6)
DQ23□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	2.12 (53.8)	—	4.24 (107.6)
DQ23□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	—	1.37 (34.8)	4.24 (107.6)

Ordering Number Description

DQ236L – FFR4 – RFR4 – FFR4 – VF – RAF2

Type	
23	2 Valves and 3 Ports

Body Material	
6L	316L SS
6LV	316L SS VAR

Port 1 Type	
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Port 2/3 Type	Port 2/3 Size
	Same as Port 1
Specified in the same way as Port 1	

Port 1 Size	
4	1/4"

Flow Path
VT
VF
VB
WT
WF

Handle Type	
R	Manual-Round Handle
U	Manual-Integral Lockout Handle

Seat	
	PCTFE
A	PFA

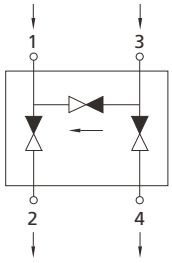
Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.

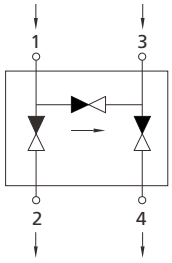
3-Valve 4-Way Block Type

Flow Paths

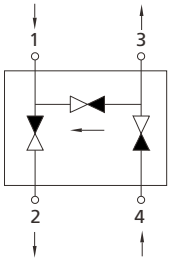
◎ Flow paths as viewed from the top



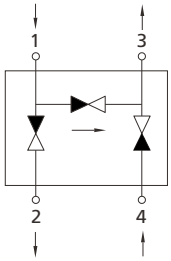
GK Flow



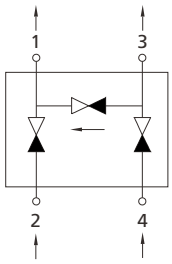
KG Flow



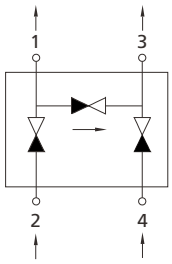
GB Flow



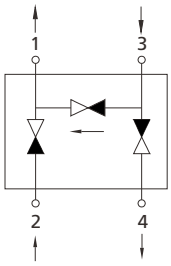
BG Flow



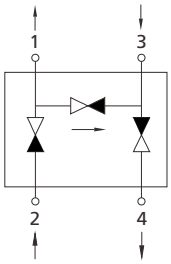
DB Flow



BD Flow



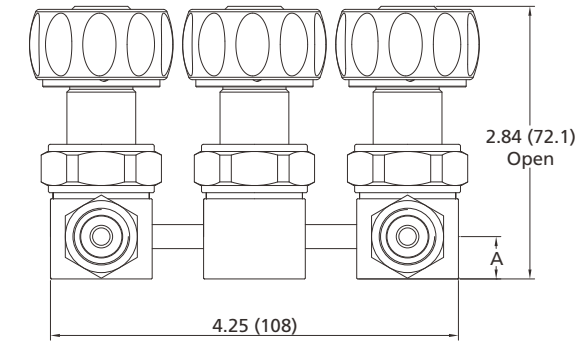
DK Flow

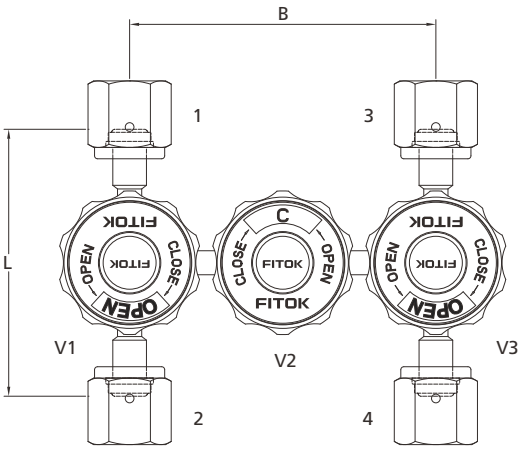


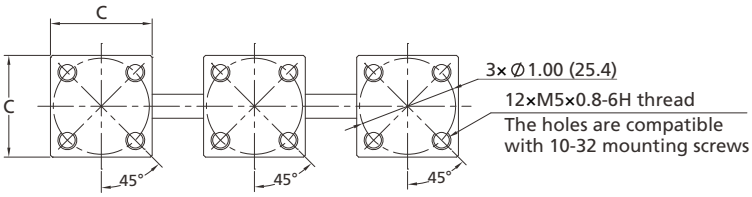
KD Flow

Dimensions

Dimensions, in inches (millimeters), are for reference only.







Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
DQ34☐☐-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	3.19 (81.0)	1.06 (26.9)	2.78 (70.6)
DQ34☐☐-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	3.19 (81.0)	1.06 (26.9)	2.78 (70.6)

Ordering Number Description

DQ346L – FFR4 – RFR4 – FFR4 – FFR4 – GK – RAF3

Type	
34	3 Valves and 4 Ports

Body Material	
6L	316L SS
6LV	316L SS VAR

Port 1 Type	
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Port 1 Size	
4	1/4"

Port 2/3/4 Type	Port 2/3/4 Size
Same as Port 1	
Specified in the same way as Port 1	

Flow Path
GK
KG
GB
BG
DB
BD
DK
KD

Handle Type	
R	Manual-Round Handle
U	Manual-Integral Lockout Handle

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Seat	
	PCTFE
A	PFA

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.

Replaceable-Seat Diaphragm Valves

DQX Series

open

close

Introduction

Replaceable-Seat Diaphragm Valves are suitable for applications requiring frequent valve maintenance and seat replacement, such as precursor containers and canisters. Their easy operation, long cycle life, and excellent sealing performance help to reduce costs for customers.

Features

◎ Easily replaceable valve seat, without need for special tools. Service kits are available
◎ Valve seat assembly with perfectly symmetrical structure to eliminate need to distinguish the orientation of seats
◎ Black handle for easy identification of replaceable-seat valves.

Technical Data

Port Size		1/4" to 3/8" or 6 mm to 8 mm
Flow Coefficient (Cv)		0.3
Orifice Size		0.16 in. (4.1 mm)
Working Pressure		Vacuum to 250 psig (17.2 bar)
Working Temperature		PCTFE：-10 ~ 176 °F (-23 ~ 80 °C) PFA：-10 ~ 302 °F (-23 ~ 150 °C)
Leak Rate (Helium)	**Internal**	≤1×10^{-9} std cm^3/s
	External	≤1×10^{-9} std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

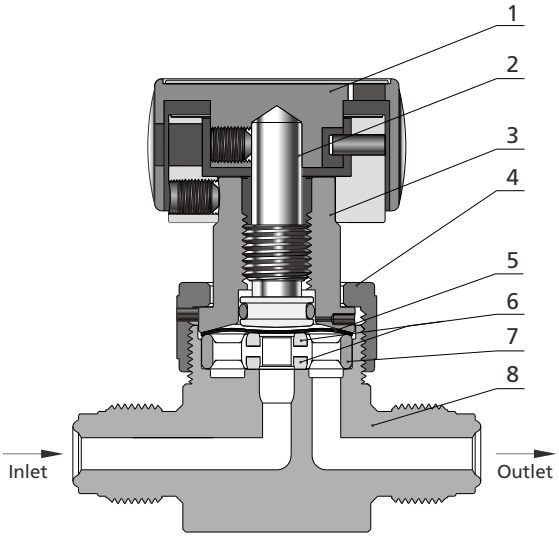
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	96	3.6
50 (3.4)	250	7.9
100 (6.8)	450	11.0

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material	316L SS	316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 5 µin. (0.13 µm)	
Polishing Process	Electropolishing	

Note: Refer to Page P-01 for a detailed description of Process Specification.

Major Materials of Construction

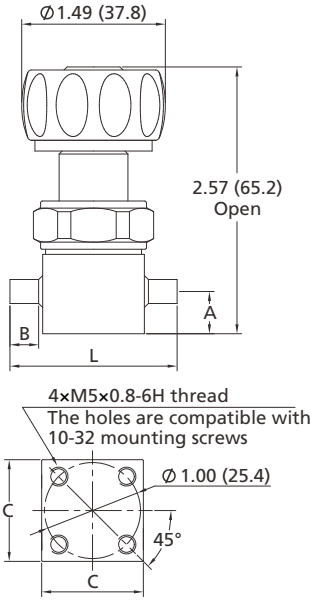


Item	Component		Material/Specification
1	Handle	Round Handle	Aluminum
		Integral Lockout Handle	Aluminum
2	Stem		316 SS/ASTM A479
3	Bonnet		S17400/ASTM A564
4	Bonnet Nut		316 SS/ASTM A479
5	Diaphragm (2)		Cobalt Alloy/AMS 5876
6	Seat		PCTFE/ASTM D1430 or PFA/ASTM D3307
7	Seat Retainer		316L SS or 316L SS VAR
8	Body		316L SS or 316L SS VAR

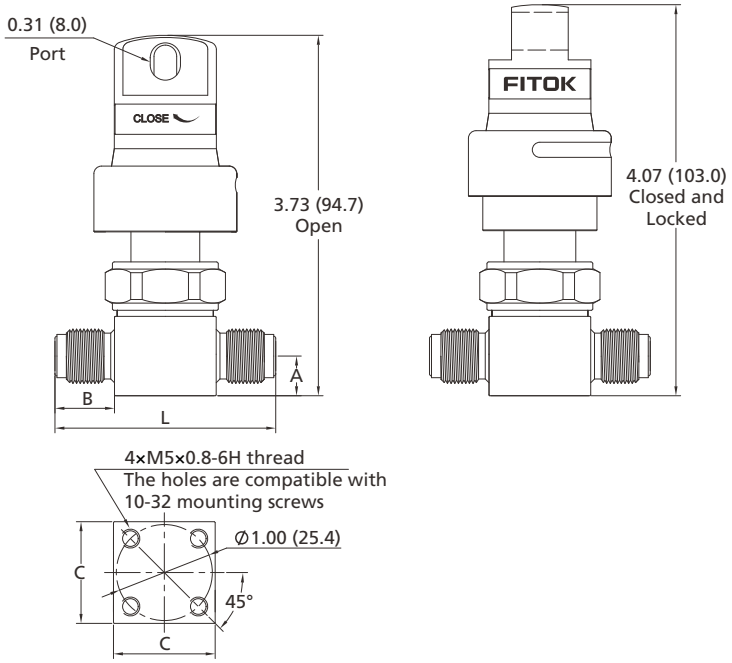
Dimensions and Ordering Information

Dimensions, in inches (millimeters), are for reference only.

Round Handle



Integral Lockout Handle



Basic Ordering Number	Connection Type and Size	Dimension, in. (mm)			
		A	B	C	L
DQX□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	1.74 (44.2)
DQX□□-TB6-	3/8"×0.035" Tube Butt Weld	0.44 (11.2)	0.26 (6.6)	1.06 (26.9)	1.74 (44.2)
DQX□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DQX□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DQX□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.62 (15.7)	1.06 (26.9)	2.30 (58.4)

Service Kit Ordering Information

Basic Ordering Information	Description	Remarks
□□DQX-KIT	Includes 1 piece of seat assembly (seat material: PCTFE), 2 pieces of cobalt alloy diaphragms, and maintenance instructions	Applies to replaceable-seat diaphragm valves
□□DQX-A-KIT	Includes 1 piece of seat assembly (seat material: PFA), 2 pieces of cobalt alloy diaphragms, and maintenance instructions	

Ordering Number Description

DQX6L – FFR4 – FR4 – RAF3

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Outlet Type / Outlet Size	
	Same as Inlet
	Specified in the same way as Inlet

Inlet Size	
4	1/4" or 1/4"×0. 035"
6	6 mm or 3/8"×0. 035"
8	8 mm

Handle Type	
R	Manual-Round Handle
U	Manual-Integral Lockout Handle

Valve Seat	
	PCTFE
A	PFA

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combinations are available. Should you have any questions, please contact FITOK Group or our authorized distributors.

Low Pressure Pneumatic Diaphragm Valves

DP Series

Introduction

DP Series Low Pressure Pneumatic Diaphragm Valves are suitable for high purity and ultra high purity applications. These valves offer enhanced reliability, a wide temperature range, and excellent medium compatibility, making them applicable to a vast majority of working conditions.

Features

◎ Minimal particle generation and minimal dead space
◎ Fully contained seat to provide excellent resistance to swelling and contamination
◎ Cobalt alloy diaphragm with high strength and corrosion resistance to ensure long cycle life
◎ Long cycle life with high speed actuation
◎ No internally wetted threads or springs which minimizes particle generation and particle entrapment for high purity.
◎ Functional under vacuum conditions
◎ Normally closed or normally open position sensors are optional for pneumatically actuated valves

Technical Data

Port Size		1/4" to 3/8" or 6 mm to 8 mm
Flow Coefficient (Cv)		0.27
Orifice Size		0.16 in. (4.1 mm)
Max. Working Pressure		250 psig (17.2 bar)
Pneumatic Actuator Operating Pressure		60 to 90 psig (4.2 to 6.2 bar)
Temperature		PCTFE: -10 ~ 176 °F (-23 ~ 80 °C) PFA: -10 ~ 302 °F (-23 ~ 150 °C)
Leak Rate (Helium)	**Internal**	$\leqslant 1\times10^{-9}$ std cm^3/s
	External	$\leqslant 1\times10^{-9}$ std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

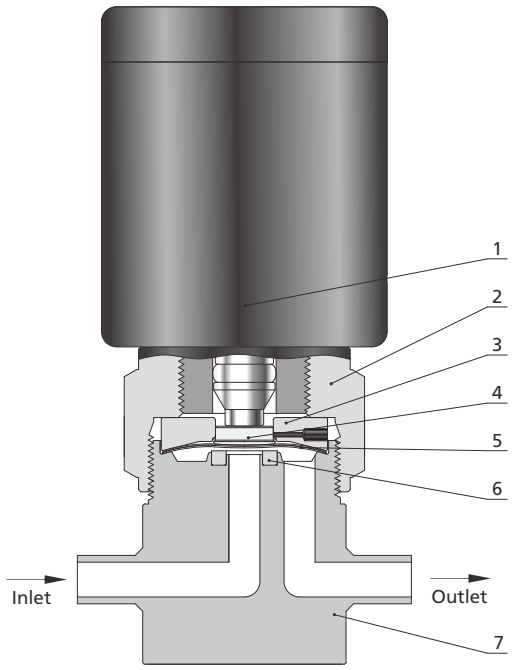
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	86	3.2
50 (3.4)	230	7.2
100 (6.8)	410	10.2

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)		Ultra High Purity Process (FC-03)
Material	316L SS		316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 10 µin. (0.25 µm)	Ra 5 µin. (0.13 µm)①	Ra 5 µin. (0.13 µm)
Polishing Process	Machine finished	Electropolished	Electropolished

Notes: Refer to page P-01 for a detailed description of Process Specification.
① Wetted surface roughness of valves with FR Series metal gasket face seal connections and tube butt weld connections.

Major Materials of Construction

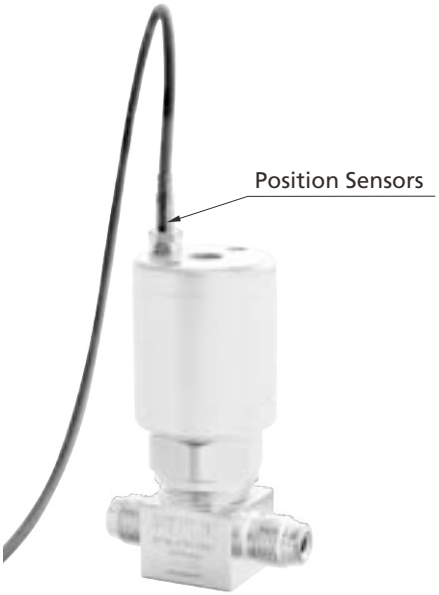


Normally Closed Pneumatic Model

Item	Component	Material/Specification
1	Actuator	Aluminum
2	Bonnet Nut	316 SS/ASTM A479
3	Bonnet	S17400/ASTM A564
4	Button	316 SS/ASTM A479
5	Diaphragm (2)	Cobalt Alloy/AMS 5876
6	Seat	PCTFE/ASTM D1430 or PFA/ASTM D3307
7	Body	316L SS or 316L SS VAR

Pneumatic Actuators

◎ Normally open, "N.O." marked on the top of the actuator
◎ Normally closed, "N.C." marked on the top of the actuator



Position Sensors

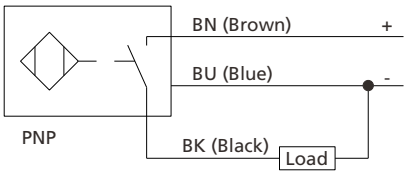
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

Technical Information

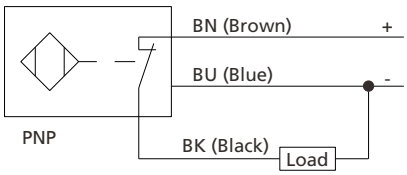
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally open position sensors



Normally closed position sensors



Notes:
1. For normally closed pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.
2. For normally open pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.

Explosion-proof Position Sensors

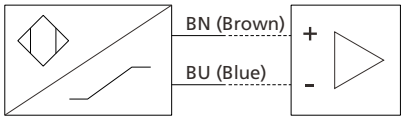
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperatre	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

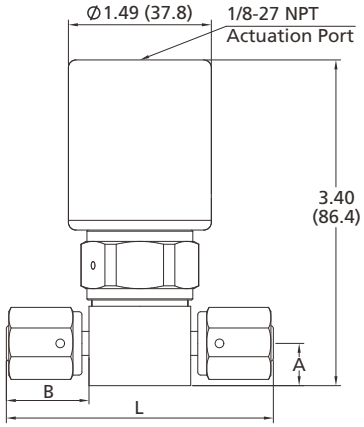


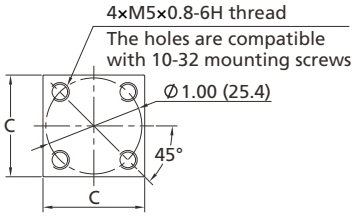
Dimensions and Ordering Information

Straight Type

Dimensions

Dimensions, in inches (millimeters), are for reference only.





Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
DP□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	1.74 (44.2)
DP□□-TB6-	3/8"×0.035" Tube Butt Weld	0.44 (11.2)	0.26 (6.6)	1.06 (26.9)	1.74 (44.2)
DP□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DP□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DP□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.62 (15.7)	1.06 (26.9)	2.30 (58.4)

Ordering Number Description

DP6L – TB4 – FR4 – CAF2MO – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting

Outlet Type / Outlet Size	
	Same as Inlet
Specified in the same way as Inlet	

Inlet Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm

Actuator Type	
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Seat	
	PCTFE
A	PFA

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

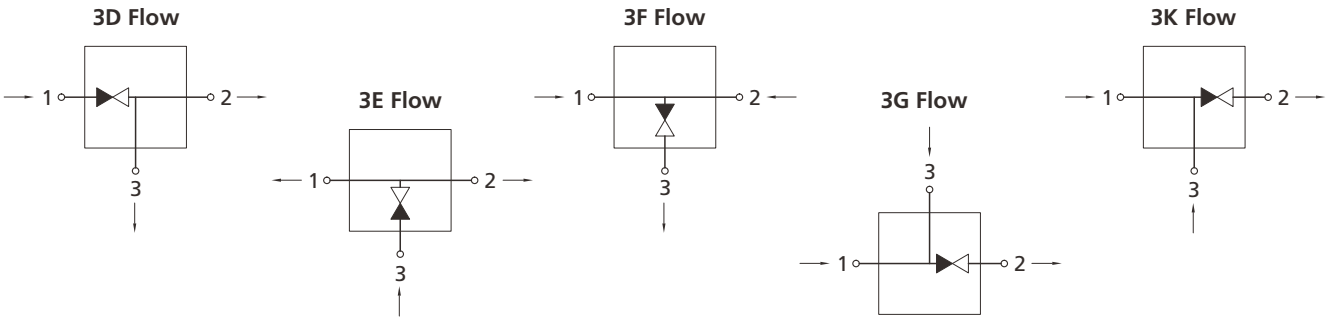
Product Certification	
	None
CE	CE Certification
AX	ATEX Certification

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

Branch Type

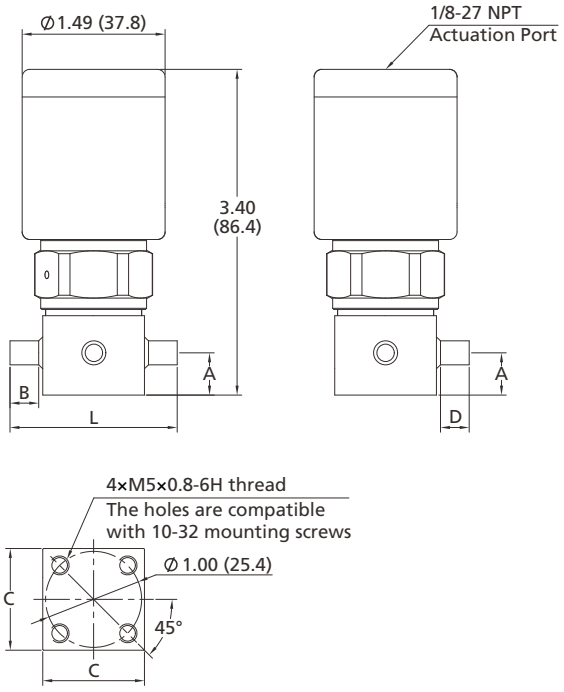
Flow Paths

◎ Flow paths as viewed from the top



Dimensions

Dimensions, in inches (millimeters), are for reference only.



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	C	D	L
DP□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	0.30 (7.6)	1.74 (44.2)
DP□□-TB6-	3/8"×0.035" Tube Butt Weld	0.44 (11.2)	0.26 (6.6)	1.06 (26.9)	0.26 (6.6)	1.74 (44.2)
DP□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	0.86 (21.8)	2.78 (70.6)
DP□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	0.86 (21.8)	2.78 (70.6)
DP□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.62 (15.7)	1.06 (26.9)	0.62 (15.7)	2.30 (58.4)

Ordering Number Description

DP6L – TB4 – FR4 – FFR4 – 3G – CAF2MO – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Port 1 Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting

Port 2/3 Type / Port 2/3 Size	
	Same as Port 1
Specified in the same way as Port 1	

Port 1 Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm

Flow Path
3D
3E
3F
3G
3K

Actuator Type	
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Seat	
	PCTFE
A	PFA

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

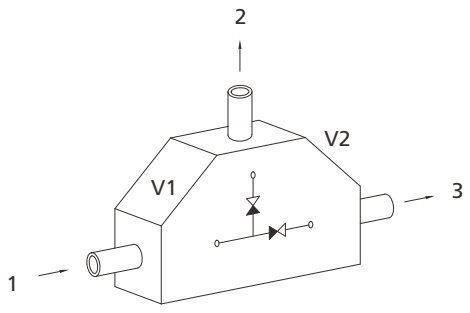
Product Certification	
	None
CE	CE Certification
AX	ATEX Certification

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available. Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

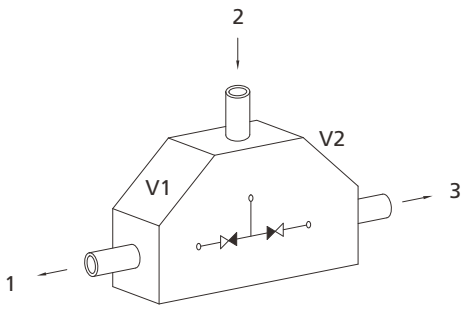
2-Valve 3-Way Block Type

Flow Paths

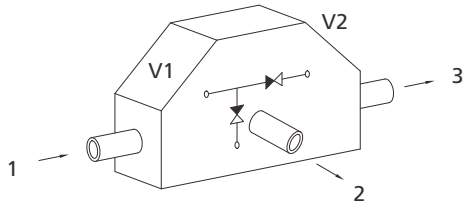
VT Flow



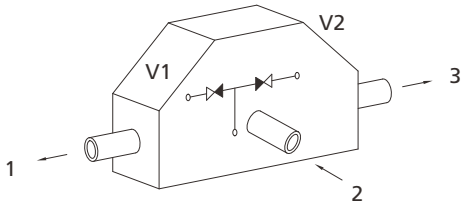
WT Flow



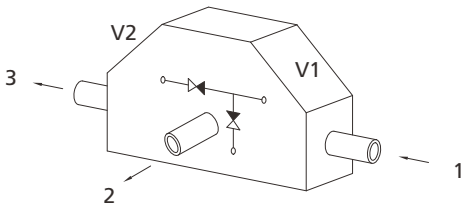
VF Flow



WF Flow

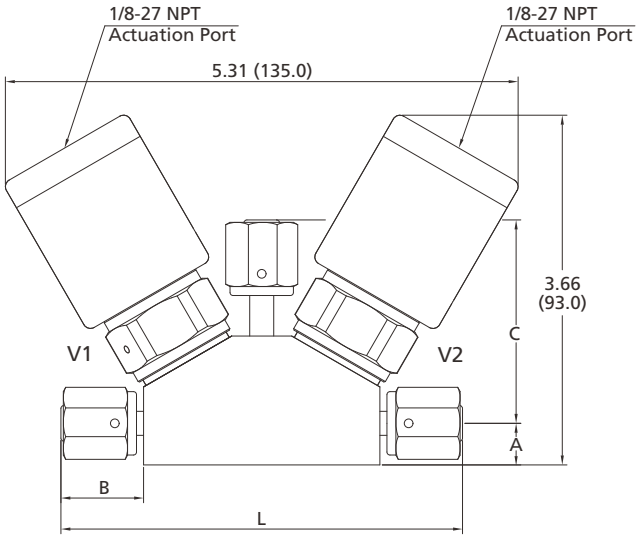


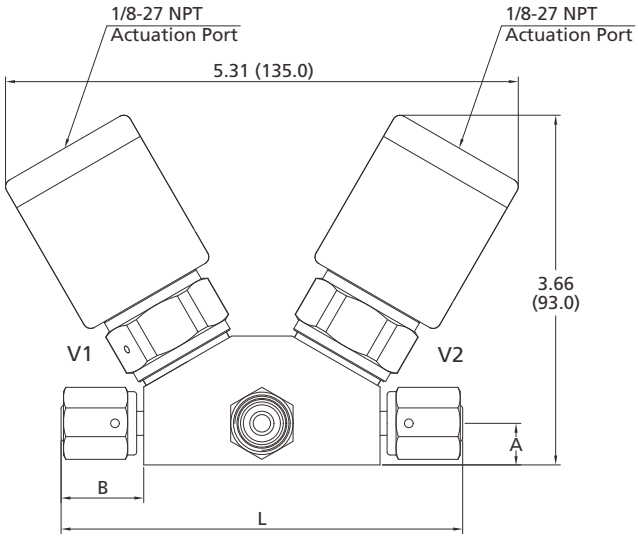
VB Flow

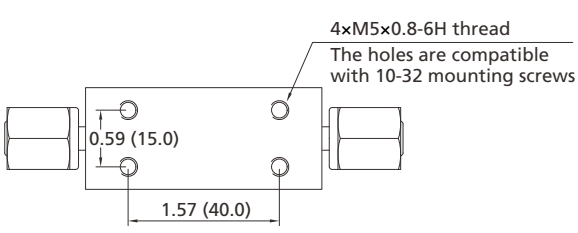


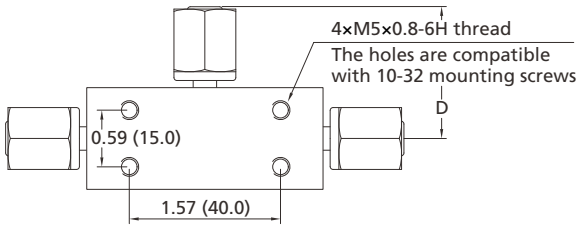
Dimensions

Dimensions, in inches (millimeters), are for reference only.









Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	C	D	L
DP23□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	2.12 (53.8)	—	4.24 (107.6)
DP23□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	—	1.37 (34.8)	4.24 (107.6)
DP23□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	2.12 (53.8)	—	4.24 (107.6)
DP23□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	—	1.37 (34.8)	4.24 (107.6)

Ordering Number Description

DP236L – FFR4 – RFR4 – FFR4 – VF – COAF2MO – CE

Type

23	2 Valves and 3 Ports

Body Material

6L	316L SS
6LV	316L SS VAR

Port 1 Type

FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Port 1 Size

4	1/4"

Port 2/3 Type / Port 2/3 Size

	Same as Port 1
	Specified in the same way as Port 1

Flow Path

VT
VF
VB
WT
WF

Actuator Type (V1 and V2)

C	V1 Normally Closed Pneumatic V2 Normally Closed Pneumatic
O	V1 Normally Open Pneumatic V2 Normally Open Pneumatic
CO	V1 Normally Closed Pneumatic V2 Normally Open Pneumatic
OC	V1 Normally Open Pneumatic V2 Normally Closed Pneumatic

Seat

	PCTFE
A	PFA

Process Specification

	FC-01
F2	FC-02
F3	FC-03

Position Sensor

	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Product Certification

	None
CE	CE Certification
AX	ATEX Certification

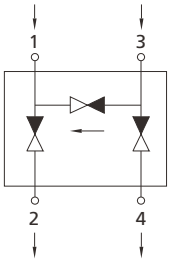
Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

3-Valve 4-Way Block Type

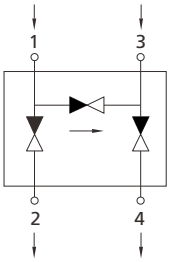
Flow Paths

◎ Flow paths as viewed from the top

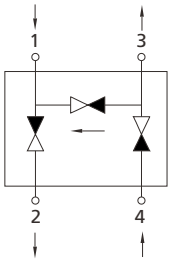
GK Flow



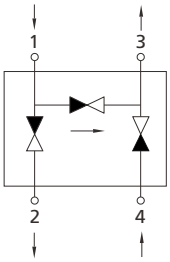
KG Flow



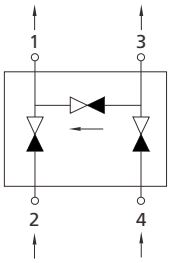
GB Flow



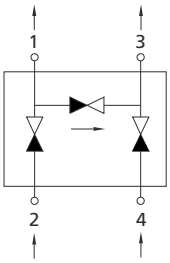
BG Flow



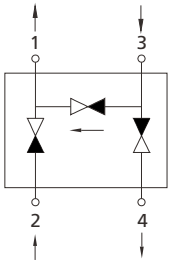
DB Flow



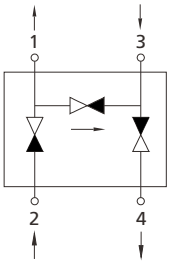
BD Flow



DK Flow

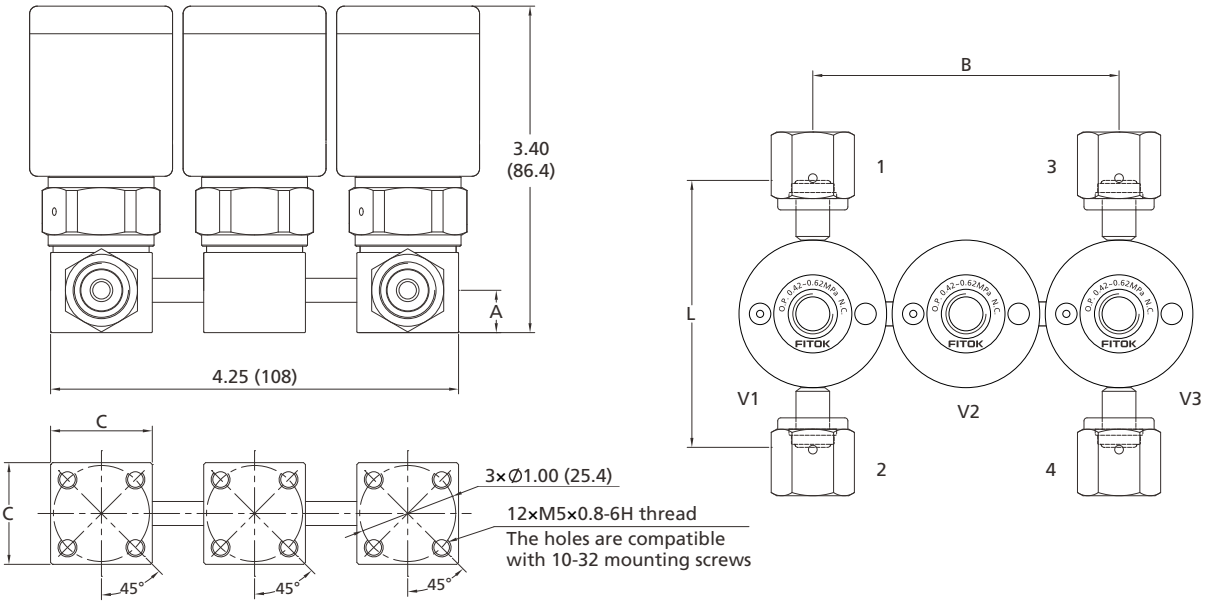


KD Flow



Dimensions

Dimensions, in inches (millimeters), are for reference only.



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
DP34□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	3.19 (81.0)	1.06 (26.9)	2.78 (70.6)
DP34□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	3.19 (81.0)	1.06 (26.9)	2.78 (70.6)

Ordering Number Description

DP346L - FFR4 - RFR4 - FFR4 - FFR4 - GK - CAF3MO - CE

Type
- **34** 3 Valves and 4 Ports

Body Material
- **6L** 316L SS
- **6LV** 316L SS VAR

Port 1 Size
- **4** 1/4"

Port 1 Type
- **FFR** Rotatable Female FR Metal Gasket Face Seal Fitting
- **RFR** Rotatable Male FR Metal Gasket Face Seal Fitting

Port 2/3/4 Type / **Port 2/3/4 Size**
- Same as Port 1

Specified in the same way as Port 1

Flow Path
- GK
- KG
- GB
- BG
- DB
- BD
- DK
- KD

Seat
- PCTFE
- **A** PFA

Actuator Type
- **C** Normally Closed Pneumatic
- **O** Normally Open Pneumatic

Process Specification
- FC-01
- **F2** FC-02
- **F3** FC-03

Position Sensor
- None
- **MO** Normally Open Position Sensor
- **MC** Normally Closed Position Sensor

Product Certification
- None
- **CE** CE Certification
- **AX** ATEX Certification

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available. Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

Replaceable-Seat Pneumatic Diaphragm Valves
DPX Series

Introduction

Replaceable-Seat Pneumatic Diaphragm Valves are suitable for applications requiring frequent valve maintenance and replacement, such as precursor containers and canisters. Their easy operation, long cycle life, and excellent sealing performance help to reduce costs for customers.

Features

◎ Easily replaceable valve seat without the need for special tools. Service kits are available
◎ Valve seat assembly with perfectly symmetrical structure to eliminate need to distinguish the orientation of seats
◎ Black actuator cylinder plate for easy identification of replaceable-seat valves

Technical Data

Port Size		1/4" to 3/8" or 6 mm to 8 mm
Flow Coefficient (Cv)		0.3
Orifice Size		0.16 in. (4.1 mm)
Working Pressure		Vacuum to 250 psig (17.2 bar)
Pneumatic Actuator Working Pressure		60 ~ 90 psig (4.2 ~ 6.2 bar)
Working Temperature		PCTFE：-10 ~ 176 °F (-23 ~ 80 °C) PFA：-10 ~ 302 °F (-23 ~ 150 °C)
Leak Rate (Helium)	**Internal**	⩽1×10^{-9} std cm^3/s
	External	⩽1×10^{-9} std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

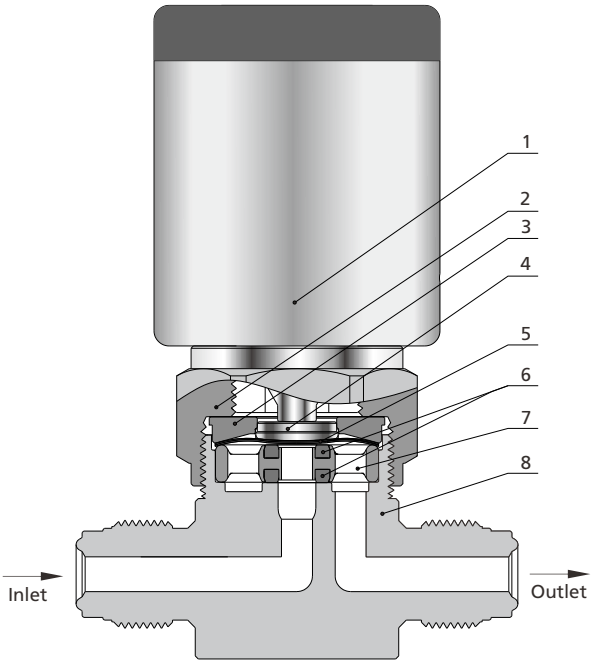
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	96	3.6
50 (3.4)	250	7.9
100 (6.8)	450	11.0

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material	316L SS	316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 5 µin. (0.13 µm)	
Polishing Process	Electropolished	

Note: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction

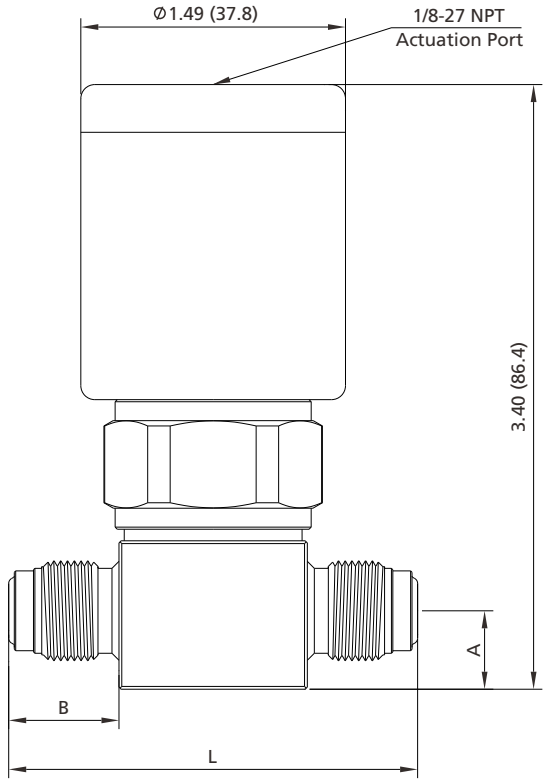


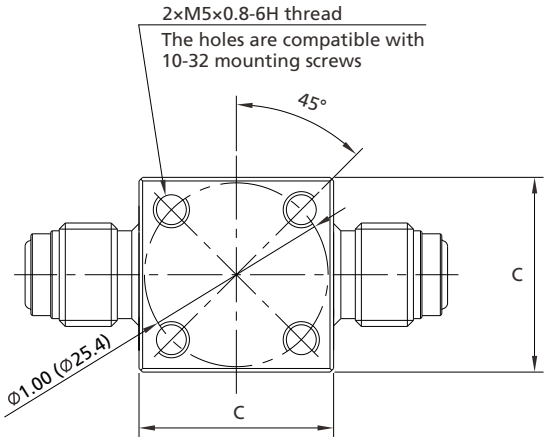
Normally Closed Pneumatic Model
(Replaceable-Seat Type)

Item	Component	Material/Specification
1	Actuator	Aluminum
2	Bonnet Nut	316 SS/ASTM A479
3	Bonnet	S17400/ASTM A564
4	Button	316 SS/ASTM A479
5	Diaphragm (2)	Cobalt Alloy/AMS 5876
6	Seat	PCTFE/ASTM D1430 or PFA/ASTM D3307
7	Seat Retainer	316L SS or 316L SS VAR
8	Body	316L SS or 316L SS VAR

Dimensions and Ordering Information

Dimensions, in inches (millimeters), are for reference only.





Basic Ordering Number	Connection Type and Size	Dimension, in. (mm)			
		A	B	C	L
DPX□□-TB4-	1/4"×0. 035"Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	1.74 (44.2)
DPX□□-TB6-	3/8"×0. 035"Tube Butt Weld	0.44 (11.2)	0.26 (6.6)	1.06 (26.9)	1.74 (44.2)
DPX□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DPX□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DPX□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.62 (15.7)	1.06 (26.9)	2.30 (58.4)

Service Kit Ordering Information

Basic Ordering Information	Description	Remarks
□□DPX-KIT	Includes 1 piece of seat assembly (seat material: PCTFE), 2 pieces of cobalt alloy diaphragms, and maintenance instructions	Applies to replaceable-seat diaphragm valves
□□DPX-A-KIT	Includes 1 piece of seat assembly (seat material: PFA), 2 pieces of cobalt alloy diaphragms, and maintenance instructions	

Ordering Number Description

DPX6L - FFR4 - FR4 - CAF3

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Inlet Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm

Outlet Type / Outlet Size	
	Same as Inlet
	Specified in the same way as Inlet

Actuator Type	
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Valve Seat	
	PCTFE
A	PFA

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.

Two-Step Pneumatic Diaphragm Valves

DPT Series

Introduction

DPT series two-step pneumatic diaphragm valves, designed for high purity and ultra high purity applications, provide a “soft start” for equipment by rapidly switching between low and high flow modes. This prevents pressure surges in the cavity and avoids scattering of particles that could contaminate the process equipment cavity as a result of the rapid flow of media into the process equipment cavity.

Features

- ◎ Fast switching between low and high flow rates
- ◎ Minimal particle generation and minimal dead space
- ◎ Cobalt alloy diaphragm with high strength and corrosion resistance to ensure long cycle life
- ◎ No internally wetted threads or springs which minimizes particle generation and particle entrapment for high purity
- ◎ Valve Cv values in low-flow mode can be preset at the factory according to customer specifications or adjusted by customers themselves

Technical Data

Port Size		1/4"
Flow Coefficient (Cv)		High-Flow (HF) Port: 0.27 Low-Flow (LF) Port: 0.02 ~ 0.12 ①
Orifice Size		0.16 in. (4.1 mm)
Working Pressure		Vacuum to 145 psig (10 bar)
Pneumatic Actuator Working Pressure		80 ~ 95 psig (5.5 ~ 6.5 bar)
Working Temperature		PFA: 14 ~ 302 °F (-10 ~ 150 °C) PCTFE: 14 ~ 176 °F (-10 ~ 80 °C)
Leak Rate (Helium)	**Internal**	$\leqslant 1\times10^{-9}$ std cm^3/s
	External	$\leqslant 1\times10^{-9}$ std cm^3/s

Note: Valve Cv values in low-flow mode can be preset at the factory according to customer specifications or adjusted by customers themselves. For detailed operating instructions, please refer to page V-41.

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

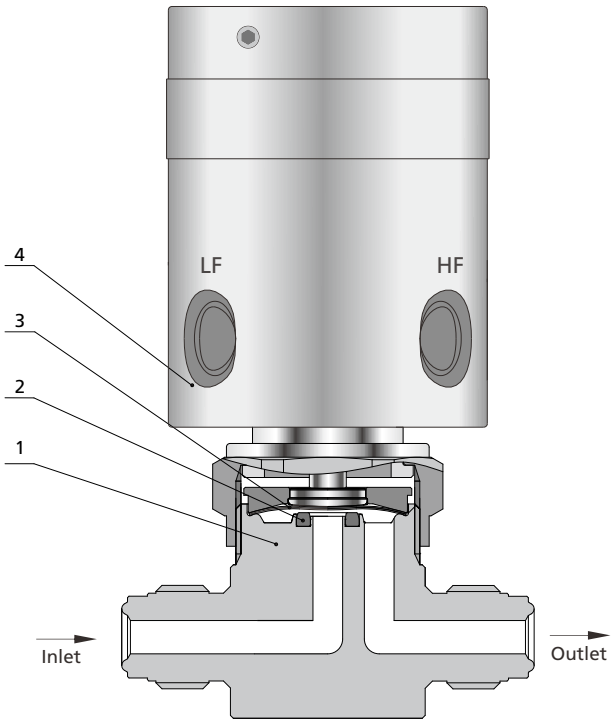
Orifice in. (mm)	Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
0.16 (4.1)	10 (0.68)	86	3.2
	50 (3.4)	230	7.2
	100 (6.8)	410	10.2

Process Specification

Item \ Process Specification	Ultra High Purity Process (FC-03)
Material	316L SS or 316L SS VAR
Wetted Surface Roughness	Ra 5 µin. (0.13 µm)
Polishing Process	Electropolished
Cleaning	Ultra high purity cleaning in continuously monitored ultrasonic cleaning system with deionized water
Assembly Environment	ISO Class 4 (FS 209E Class 10 equivalent) cleanroom
Packaging	Double bagged, packaged in the cleanroom

Notes: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction

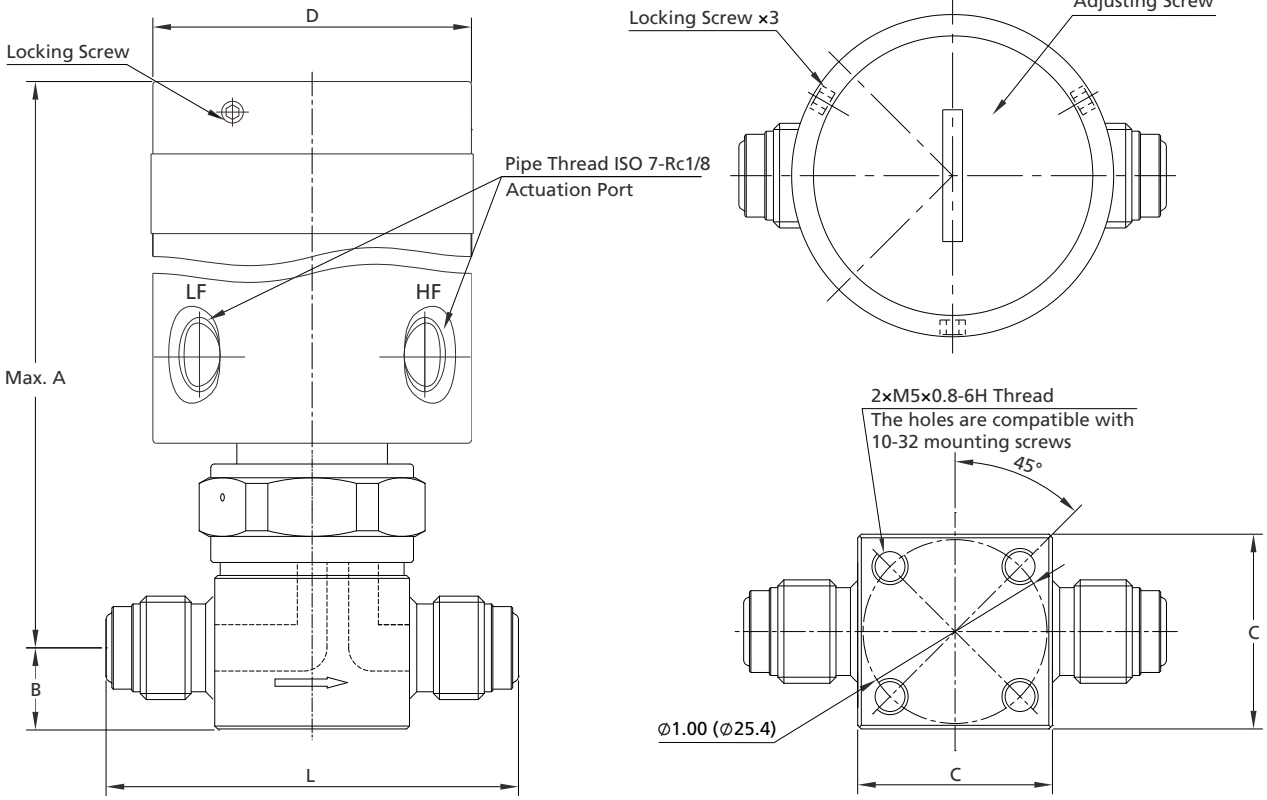


Nomally Closed Pneumatic Actuator

Item	Component	Material/Specification
1	Body	316L SS or 316L SS VAR
2	Seat	PCTFE/ASTM D1430 or PFA/ASTM D3307
3	Diaphragm	Cobalt Alloy/AMS 5876
4	Actuator	Aluminium

Dimensions and Ordering Information

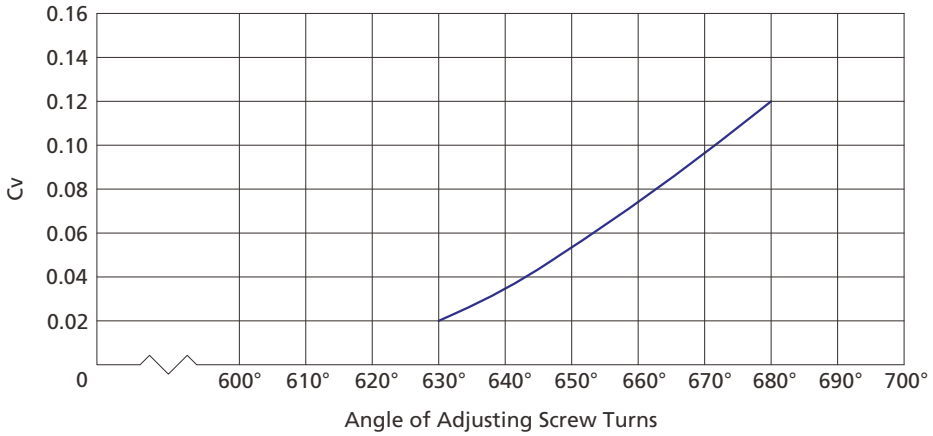
Dimensions, in inches (millimeters), are for reference only.



Flow Adjustment Instructions for Low-Flow Mode:

Loosen three locking screws and reach the groove of the adjusting screw on the top with the tool to turn the adjusting screw to the end in the clockwise direction and then rotate it counterclockwise until the required Cv is reached (see the Cv Graph for the relationship between Cv and adjusting angle). Tighten locking screws after desired Cv is reached.

Cv Graph for Low Flow Mode



Basic Ordering Number	Connection Type and Size	Dimensions, in. (mm)				
		A	B	C	D	L
DPT6L-FR4-CAF3	1/4" Integral Male FR Metal Gasket Face Seal Fitting	3.54 (90.0)	0.44 (11.2)	1.06 (26.9)	1.73 (44.0)	2.24 (57.0)
DPT6L-FFR4-CAF3	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	3.54 (90.0)	0.44 (11.2)	1.06 (26.9)	1.73 (44.0)	2.78 (70.6)

Ordering Number Description

DPT6L - FFR4 - RFR4 - CAF3

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Inlet Size	
4	1/4"

Outlet Type / Outlet Size	
	Same as Inlet
	Specified in the same way as Inlet

Actuator Type	
C	Normally Closed Pneumatic

Seat	
	PCTFE
A	PFA

Process Specification	
F3	FC-03

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.

High Pressure Springless Diaphragm Valves
DH Series

Introduction

DH Series High Pressure Springless Diaphragm Valves are suitable for high purity and ultra high purity applications. Featuring an internally springless flow path, these valves ensure high cleanliness and offer multiple flow path options, providing exceptional versatility.

Features

◎ Metal-to-metal diaphragm seal
◎ Cobalt alloy diaphragm with high strength and corrosion resistance to ensure long cycle life
◎ Long cycle life in high pressure applications
◎ Manual and pneumatic actuators available
◎ Normally closed or normally open position sensors are optional for pneumatically actuated valves

Technical Data

Port Size		1/4" to 3/8" or 6 mm to 8 mm
Flow Coefficient (Cv)		0.20
Orifice Size		0.16 in. (4.1 mm)
Max. Working Pressure		3000 psig (206 bar)
Pneumatic Actuator Operating Pressure		75 to 105 psig (5.2 to 7.2 bar)
Temperature		PCTFE: -10 ~ 150 °F (-23 ~ 65 °C) Polyimide: 50 ~ 302 °F (10 ~ 150 °C)
Leak Rate (Helium)	**Internal**	$\leqslant 1\times10^{-9}$ std cm^3/s
	External	$\leqslant 1\times10^{-9}$ std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

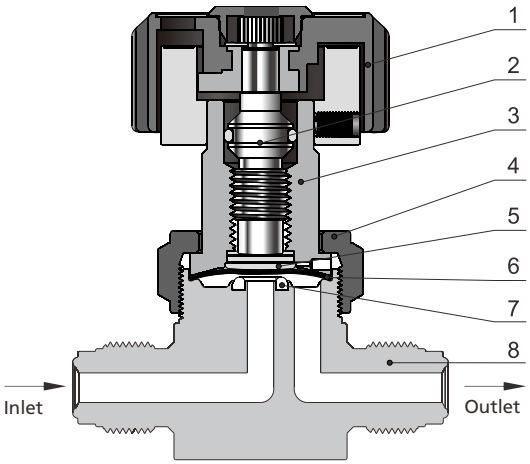
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	64	2.4
50 (3.4)	170	5.4
100 (6.8)	300	7.6

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)		Ultra High Purity Process (FC-03)
Material	316L SS		316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 10 µin. (0.25 µm)	Ra 5 µin. (0.13 µm)①	Ra 5 µin. (0.13 µm)
Polishing Process	Machine finished	Electropolished	Electropolished

Notes: Refer to page P-01 for a detailed description of Process Specification.
① Wetted surface roughness of valves with FR Series metal gasket face seal connections and tube butt weld connections.

Major Materials of Construction



Manual Model

Item	Component	Material/Specification
1	Handle	ABS
2	Stem	316 SS/ASTM A479
3	Bonnet	S17400/ASTM A564
4	Bonnet Nut	316 SS/ASTM A479
5	Button	316 SS/ASTM A479
6	Diaphragm (5)	Cobalt Alloy (3)/AMS 5876 + C17200 (2)/ASTM B194
7	Seat	PCTFE/ASTM D1430 or Polyimide
8	Body	316L SS or 316L SS VAR

Handles and Actuators

Manual - Round Handle

- Quick, quarter-turn actuation
- Handle with window to visually indicate open and closed states

Pneumatic

- Normally open, "N.O." marked on the top of the actuator
- Normally closed, "N.C." marked on the top of the actuator

Position Sensors

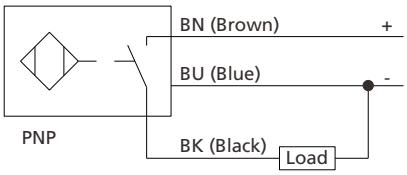
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

Technical Information

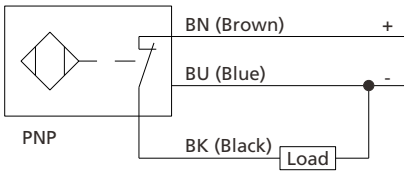
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally open position sensors



Normally closed position sensors



Notes:
1. For normally closed pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.
2. For normally open pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are closed. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are open.

Explosion-proof Position Sensors

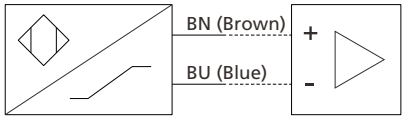
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperatre	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram



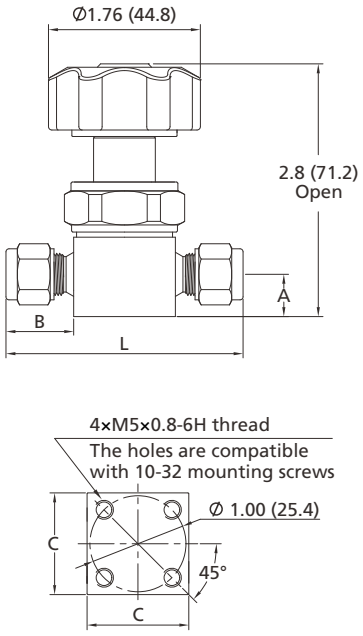
Dimensions and Ordering Information

Straight Type

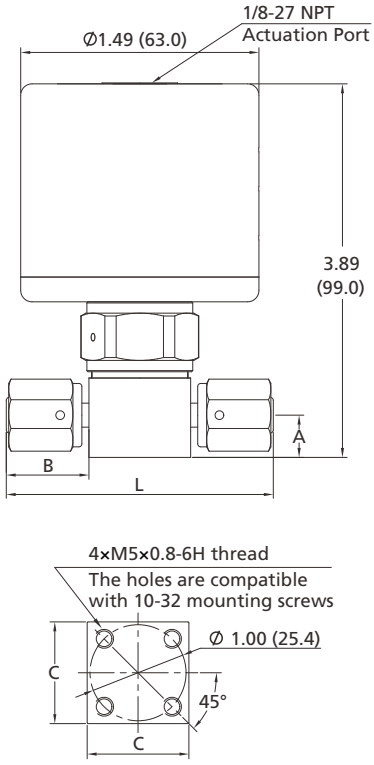
Dimensions

Dimensions, in inches (millimeters), are for reference only.

Manual - Round Handle



Pneumatic



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
DH□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	1.74 (44.2)
DH□□-TB6-	3/8"×0.035" Tube Butt Weld		0.26 (6.6)		1.74 (44.2)
DH□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting		0.86 (21.8)		2.78 (70.6)
DH□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting		0.86 (21.8)		2.78 (70.6)
DH□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting		0.62 (15.7)		2.30 (58.4)
DH□□-ML6-	6 mm FITOK Tube Fitting		0.70 (17.9)		2.47 (62.7)

Ordering Number Description

DH6L – FL4 – ML6 – CVF2MO – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting

Outlet Type	Outlet Size
	Same as Inlet
Specified in the same way as Inlet	

Inlet Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm

Handle and Actuator	
R	Manual-Round Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Note: For butt weld connection, pneumatic actuator is not recommended unless it causes no interference to welding.

Seat	
	PCTFE
V	Polyimide

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

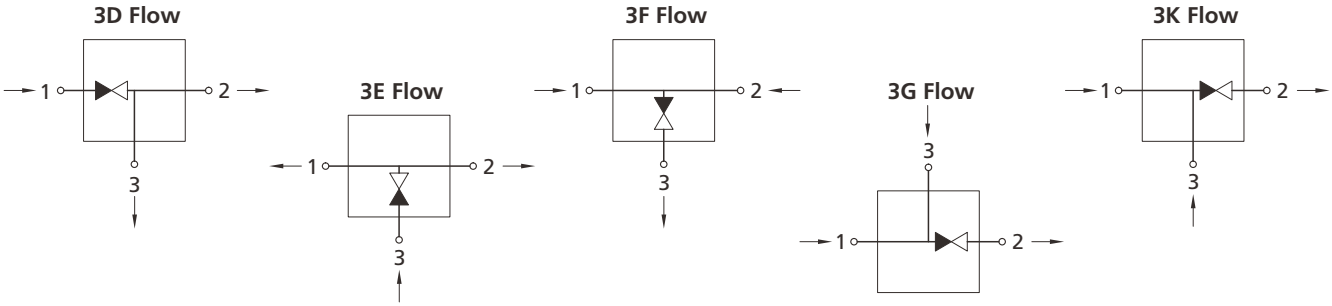
Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

Branch Type

Flow Paths

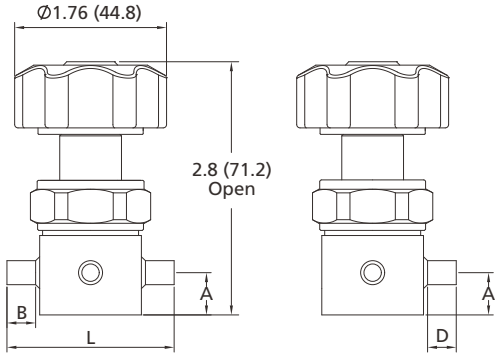
◎ Flow paths as viewed from the top



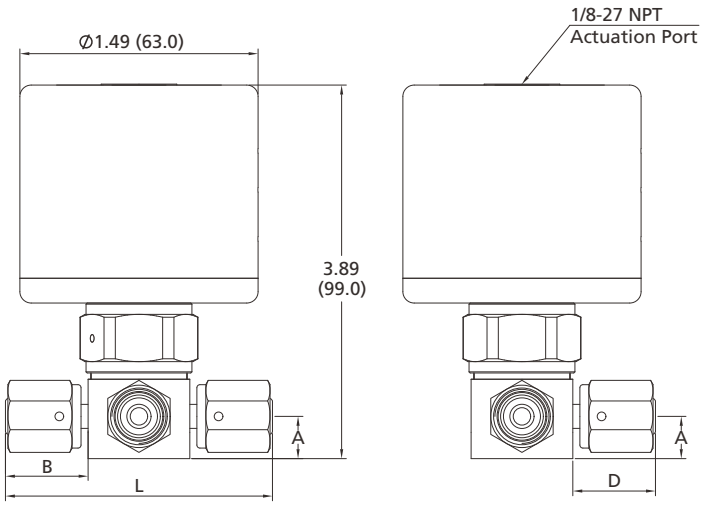
Dimensions

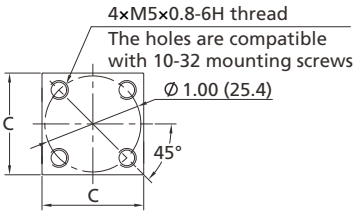
Dimensions, in inches (millimeters), are for reference only.

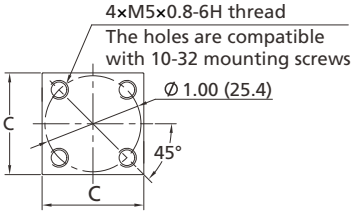
Manual - Round Handle



Pneumatic







Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	C	D	L
DH□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	0.30 (7.6)	1.74 (44.2)
DH□□-TB6-	3/8"×0.035" Tube Butt Weld	0.44 (11.2)	0.26 (6.6)	1.06 (26.9)	0.26 (6.6)	1.74 (44.2)
DH□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	0.86 (21.8)	2.78 (70.6)
DH□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	0.86 (21.8)	2.78 (70.6)
DH□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.62 (15.7)	1.06 (26.9)	0.62 (15.7)	2.30 (58.4)
DH□□-FL4-	1/4" FITOK Tube Fitting	0.44 (11.2)	0.70 (17.9)	1.06 (26.9)	0.70 (17.9)	2.47 (62.7)

Ordering Number Description

DH6L – TB4 – TB4 – FR4 – 3F – CVF2MO – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Port 1 Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm

Port 2/3 Type / Port 2/3 Size	
	Same as Port 1
	Specified in the same way as Port 1

Handle and Actuator	
R	Manual-Round Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Note: For butt weld connection, pneumatic actuator is not recommended unless it causes no interference to welding.

Seat	
	PCTFE
V	Polyimide

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Port 1 Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting

Flow Path
3D
3E
3F
3G
3K

Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

Notes:

1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

High Pressure Spring Diaphragm Valves

DM Series

Introduction

DM Series High Pressure Spring Diaphragm Valves are suitable for high purity and ultra high purity applications. These valves offer a small seat sealing surface, a wide working temperature range, and an easily replaceable seat, with an maximum pressure rating of 3500 psig.

Features

- ◎ All-metal containment
- ◎ Repetitive shutoff with fully contained soft-seat stem tip
- ◎ Position indicator ring for lever handle indicates open and closed states
- ◎ Reduced seat volume
- ◎ Functional under vacuum conditions
- ◎ Different manual and pneumatic actuators available
- ◎ Normally closed or normally open position sensors are optional for pneumatically actuated valves

Technical Data

Port Size		1/4" to 3/8" or 6 mm to 8 mm
Flow Coefficient (Cv)	**Lever Handle**	0.14
	Round Handle	0.30
	Pneumatic Actuator	0.20
Orifice Size		0.16 in. (4.1 mm)
Max. Working Pressure		3500 psig (241 bar)
Max. Differential Back Pressure①		1500 psig (103 bar)
Pneumatic Actuator Operating Pressure		60 to 90 psig (4.2 to 6.2 bar)
Temperature		PCTFE: -100 ~ 250 °F (-73 ~ 121 °C) Polyimide: -100 ~ 320 °F (-73 ~ 160 °C)
Leak Rate (Helium)	**Internal**	$\leqslant 4\times10^{-9}$ std cm^3/s
	External	$\leqslant 4\times10^{-9}$ std cm^3/s

① Differential back pressure is equal to the outlet pressure minus the inlet pressure.
When the differential back pressure is greater than 1500 psig (103 bar), the valve will not open.
A17-7 SS spring can be used to increase the max. differential back pressure to 2500 psig (172 bar)
To order, please contact FITOK Group or our authorized distributors.

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

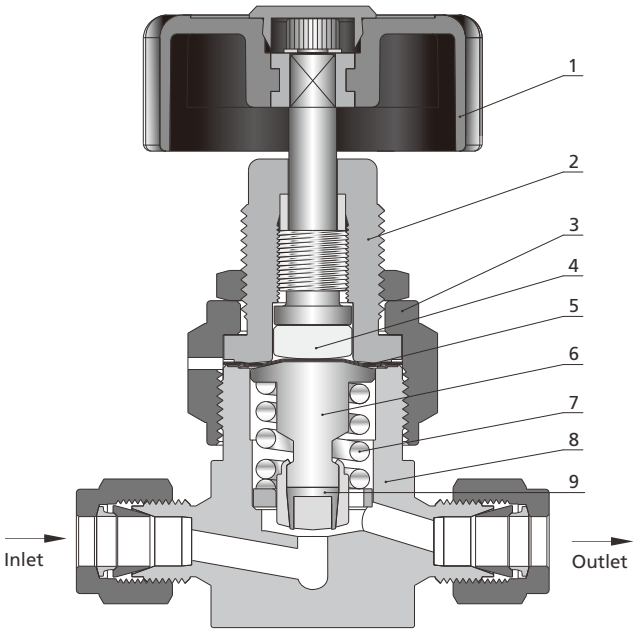
Pressure Drop to Atmosphere psig (bar)	Lever Handle		Round Handle		Pneumatic Actuator	
	Air (l/min)	Water (l/min)	Air (l/min)	Water (l/min)	Air (l/min)	Water (l/min)
10 (0.68)	49	1.6	100	3.5	64	2.4
50 (3.4)	130	3.9	270	8.0	170	5.4
100 (6.8)	240	5.4	490	11.4	300	7.6

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material	316L SS	316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 20 µin. (0.5 µm)	Ra 10 µin. (0.25 µm)
Polishing Process	Machine finished	Electropolished

Note: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction



Round Handle Model

Item	Component	Material/Specification
1	Handle	Aluminum
2	Bonnet	316 SS/ASTM A479
3	Bonnet Nut	316 SS/ASTM A479
4	Button	316 SS/ASTM A479
5	Diaphragm (3)	Cobalt Alloy/AMS 5876
6	Stem	316L SS or 316L SS VAR
7	Spring	316 SS/ASTM A313
8	Body	316L SS or 316L SS VAR
9	Seat	PCTFE/ASTM D1430 or Polyimide

Handles and Actuators

Manual - Lever Handle

◎ Quick, quarter-turn actuation
◎ Position indicator ring to visually indicate open and closed states

Manual - Round Handle

◎ One and a half turns to operate from fully open to closed

Pneumatic

◎ Normally open, "N.O." marked on the top of the actuator
◎ Normally closed, "N.C." marked on the top of the actuator

Position Sensors

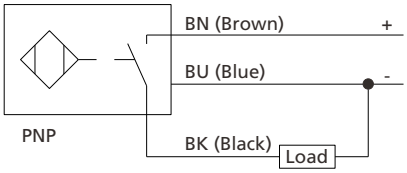
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

Technical Information

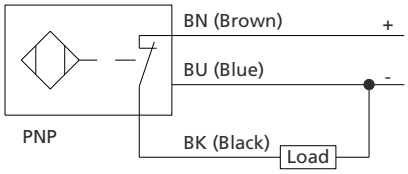
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally open position sensors



Normally closed position sensors



Notes:
1. For normally closed pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.
2. For normally open pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are closed. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are open.

Explosion-proof Position Sensors

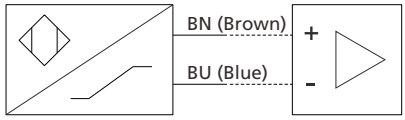
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperatre	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram



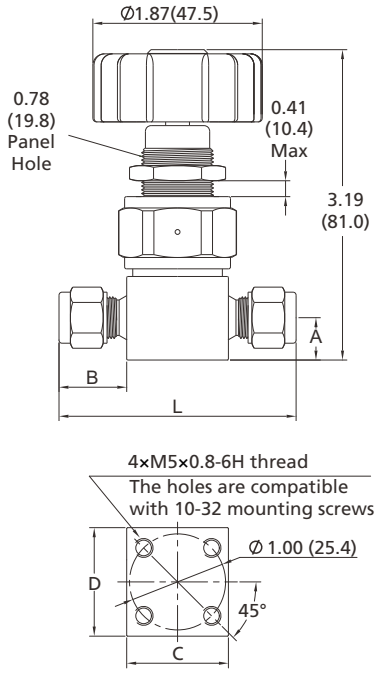
Dimensions and Ordering Information

Straight Type

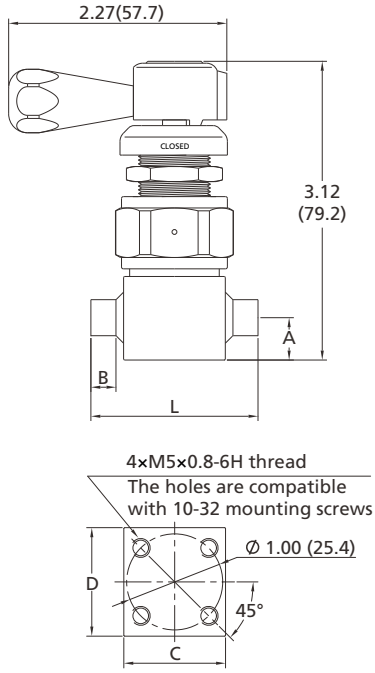
Dimensions

Dimensions, in inches (millimeters), are for reference only.

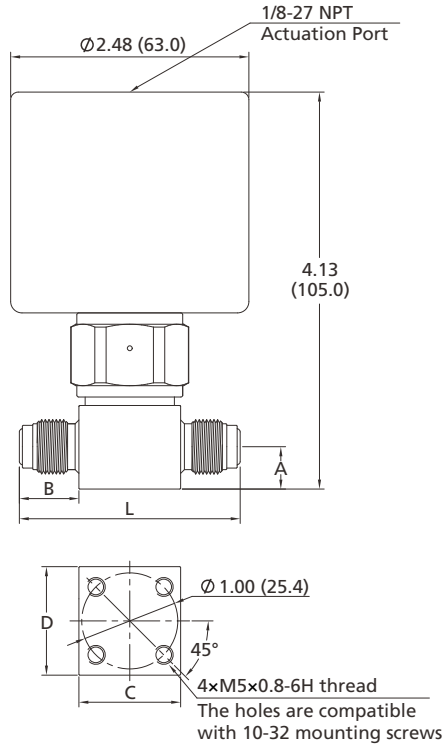
Manual - Round Handle



Manual - Lever Handle



Pneumatic



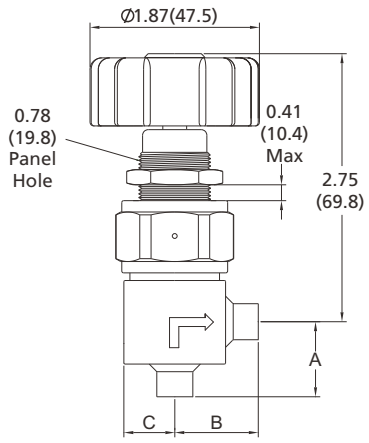
Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	C	D	L
DM□□-FL4-	1/4" FITOK Tube Fitting	0.44 (11.2)	0.69 (17.6)	1.06 (26.9)	1.13 (28.7)	2.47 (62.1)
DM□□-FL6-	3/8" FITOK Tube Fitting		0.76 (19.3)			2.58 (65.5)
DM□□-ML6-	6 mm FITOK Tube Fitting		0.70 (17.9)			2.47 (62.8)
DM□□-ML8-	8 mm FITOK Tube Fitting		0.74 (18.7)			2.53 (64.3)
DM□□-TB4-	1/4"×0.035" Tube Butt Weld		0.30 (7.6)			1.74 (44.2)
DM□□-TB6-	3/8"×0.035" Tube Butt Weld		0.26 (6.6)			1.74 (44.2)
DM□□-NS4-	1/4" Male NPT		—			2.46 (62.5)
DM□□-FNS4-	1/4" Female NPT		—			2.46 (62.5)
DM□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting		0.62 (15.7)			2.30 (58.4)
DM□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting		0.85 (21.6)			2.76 (70.1)
DM□□-FO4-	1/4" Male FO		0.47 (11.9)			2.00 (50.8)

Angle Type

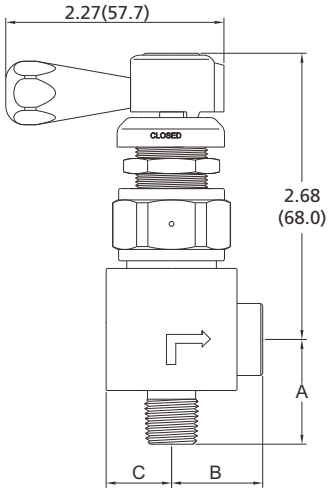
Dimensions

Dimensions, in inches (millimeters), are for reference only.

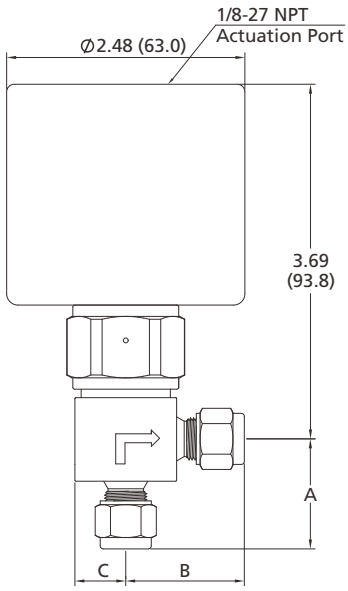
Manual - Round Handlee



Manual - Lever Handle



Pneumatic



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)		
		A	B	C
DM□□-FL4-	1/4" FITOK Tube Fitting	1.14 (29.1)	1.23 (31.3)	0.53 (13.4)
DM□□-ML6-	6 mm FITOK Tube Fitting	1.14 (29.1)	1.23 (31.3)	0.53 (13.4)
DM□□-TB6-	3/8"×0.035" Tube Butt Weld	0.78 (19.8)	0.87 (22.0)	0.53 (13.4)
DM□□-NS4-FNS4	Inlet 1/4" Male NPT	1.09 (27.7)	0.95 (24.1)	0.68 (17.3)
	Outlet 1/4" Female NPT			

Ordering Number Description

DM6L – FL4 – ML6 – A – CVF2MO – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
FO	Male FO Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting
NS	Male NPT
FNS	Female NPT

Outlet Type / Outlet Size	
	Same as Inlet

Specified in the same way as Inlet

Inlet Size	
4	1/4" or 1/4"x0.035"
6	6 mm or 3/8"x0.035"
8	8 mm or 1/2"

Flow Path	
	Straight
A	Angle

Handle and Actuator	
R	Manual-Round Handle
L	Manual-Lever Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Note: For butt weld connection, pneumatic actuator is not recommended unless it causes no interference to welding.

Seat	
	PCTFE
V	Polyimide

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

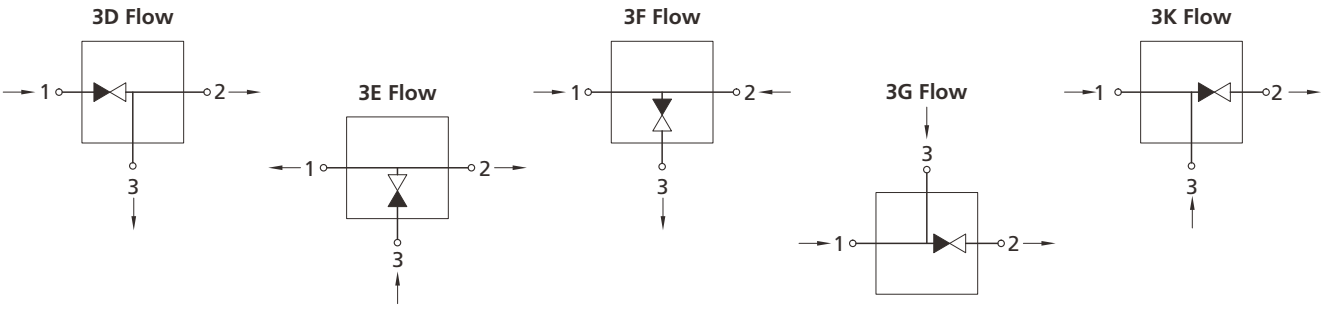
Notes:

1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

Branch Type

Flow Paths

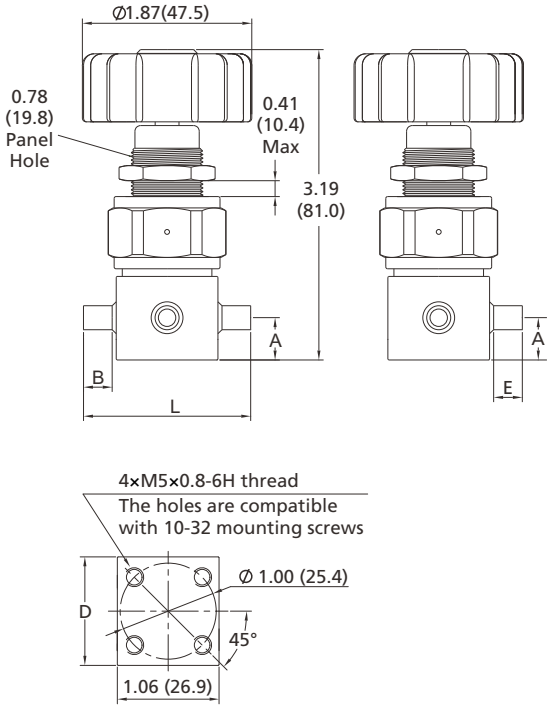
◎ Flow paths as viewed from the top



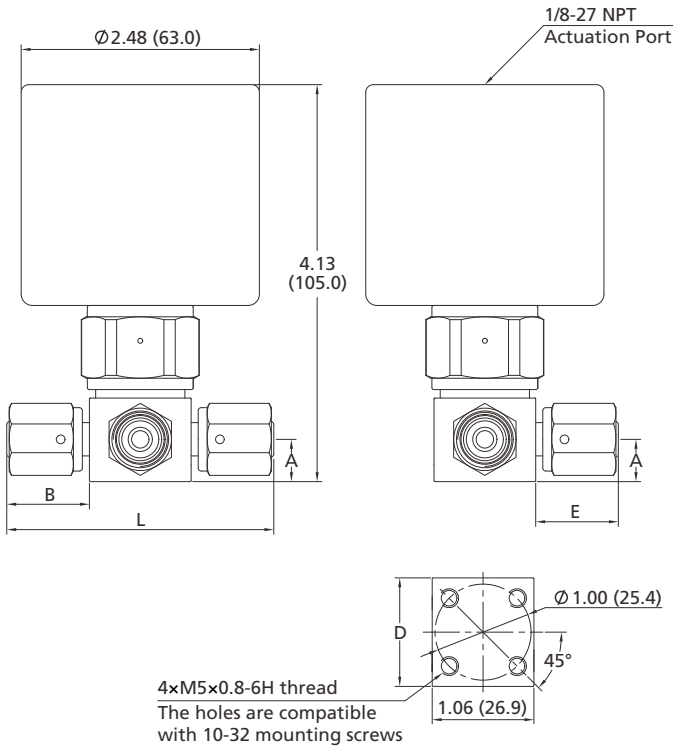
Dimensions

Dimensions, in inches (millimeters), are for reference only.

Manual - Round Handle



Pneumatic



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	D	E	L
DM□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.13 (28.7)	0.30 (7.6)	1.74 (44.2)
DM□□-MTB6-	3/8"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.13 (28.7)	0.30 (7.6)	1.74 (44.2)
DM□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.85 (21.6)	1.13 (28.7)	0.85 (21.6)	2.76 (70.1)
DM□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	1.21 (30.7)	1.13 (28.7)	1.21 (30.7)	3.48 (88.4)

Ordering Number Description

DM6L – TB4 – TB4 – FFR4 – 3F – CVF2MO – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Port 1 Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"x0.035"

Port 2/3 Type / Port 2/3 Size	
	Same as Port 1
Specified in the same way as Port 1	

Port 1 Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Flow Path
3D
3E
3F
3G
3K

Handle and Actuator	
R	Manual-Round Handle
L	Manual-Lever Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Note: For butt weld connection, pneumatic actuator is not recommended unless it causes no interference to welding.

Seat	
	PCTFE
V	Polyimide

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

Notes:

1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

High Pressure Compact Diaphragm Valves

DS Series

Features

DS Series High Pressure Compact Diaphragm Valves are suitable for high purity and ultra high purity applications. Featuring an internally springless flow path, these valves offer high cleanliness. The pneumatically actuated valves are small in size, making them ideal for use on compact equipment. Additionally, the manual valves boast a pressure rating of up to 4500 psig.

Features

- ◎ Reduced inner volume
- ◎ Minimized number of components
- ◎ Manual and pneumatic actuators available
- ◎ Aluminum piston to increase operation speed

Technical Data

Port Size		1/4" to 3/8" or 6 mm to 8 mm
Flow Coefficient (Cv)		0.17
Orifice Size		0.12 in. (3.0 mm)
Max. Working Pressure	**Manual**	4500 psig (310 bar)
	Pneumatic	3000 psig (206 bar)
Pneumatic Actuator Operating Pressure		60 to 90 psig (4.2 to 6.2 bar)
Temperature		PCTFE: -10 ~ 150 °F (-23 ~ 65 °C) Polyimide: -10 ~ 250 °F (-23 ~ 121 °C)
Leak Rate (Helium)	**Internal**	$\leqslant 1\times10^{-9}$ std cm^3/s
	External	$\leqslant 1\times10^{-9}$ std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

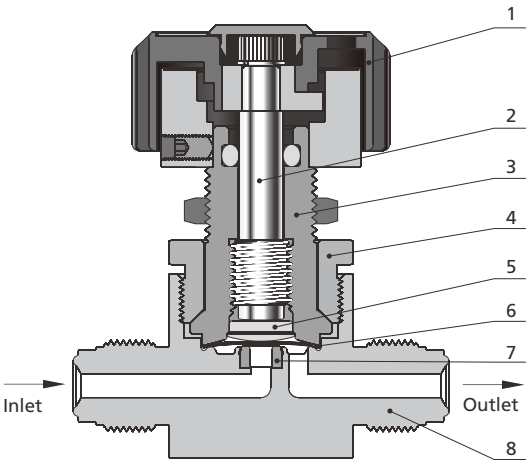
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	55	1.9
50 (3.4)	150	4.5
100 (6.8)	260	6.4

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material	316L SS	316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 20 µin. (0.5 µm)	Ra 10 µin. (0.25 µm)
Polishing Process	Machine finished	Electropolished

Note: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction



Manual Model

Item	Component	Material/Specification
1	Handle	ABS
2	Stem	316 SS/ASTM A479
3	Bonnet	S17400/ASTM A564
4	Bonnet Nut	316 SS/ASTM A479
5	Button	316 SS/ASTM A479
6	Diaphragm (5)	Cobalt Alloy (3) /AMS 5876 + C17200 (2) /ASTM B194
7	Seat	PCTFE/ASTM D1430 or Polyimide
8	Body	316L SS or 316L SS VAR

Handles and Actuators

Manual - Round Handle

- Quick, quarter-turn actuation
- Handle with window to visually indicate open and closed states

Pneumatic

- Normally open, "N.O." marked on the top of the actuator
- Normally closed, "N.C." marked on the top of the actuator

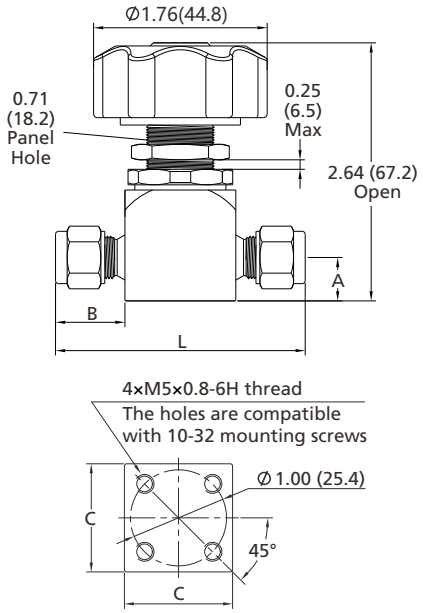
Dimensions and Ordering Information

Straight Type

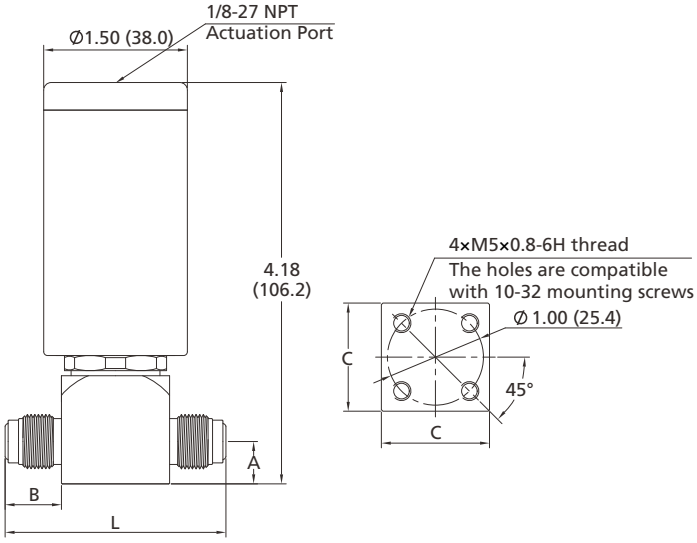
Dimensions

Dimensions, in inches (millimeters), are for reference only.

Manual - Round Handle



Pneumatic



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
DS□□-TB4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.34 (8.6)	1.12 (28.6)	1.81 (45.9)
DS□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting		0.86 (21.8)		2.85 (72.3)
DS□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting		0.58 (14.9)		2.30 (58.4)
DS□□-FL4-	1/4" FITOK Tube Fitting		0.70 (17.9)		2.54 (64.4)
DS□□-NS4-	1/4" Male NPT		0.56 (14.2)		2.24 (57.0)
DS□□-FNS4-	1/4" Female NPT		—		2.36 (60.0)

Ordering Number Description

DS6L – NS4 – FNS4 – RVF2 – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting
NS	Male NPT
FNS	Female NPT

Outlet Type / Outlet Size	
	Same as Inlet
	Specified in the same way as Inlet

Inlet Size	
4	1/4" or 1/4"×0.035"
6	6 mm
8	8 mm

Actuator Type	
R	Manual-Round Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Seat	
	PCTFE
V	Polyimide

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

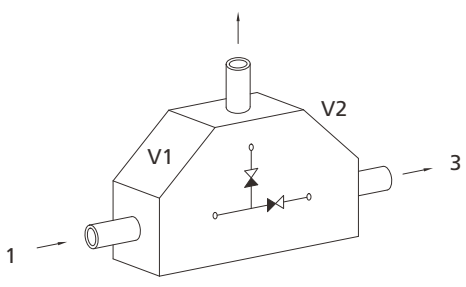
Product Certification	
	None
CE	CE Certification (For Pneumatic only)

Note:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. For -CE selections, products have "CE" lettering.

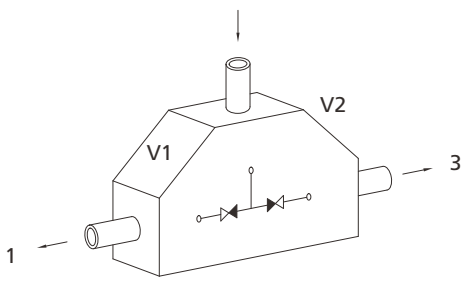
2-Valve 3-Way Block Type

Flow Paths

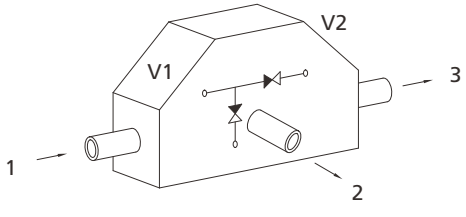
VT Flow



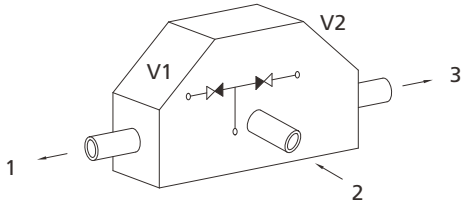
WT Flow



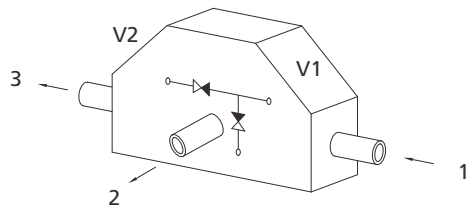
VF Flow



WF Flow



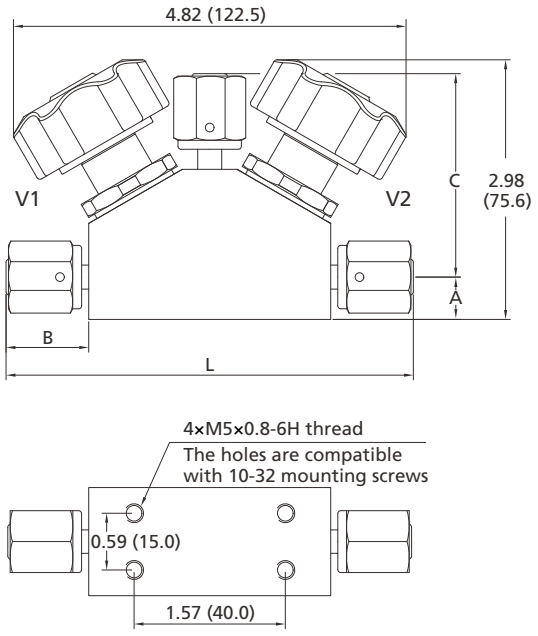
VB Flow



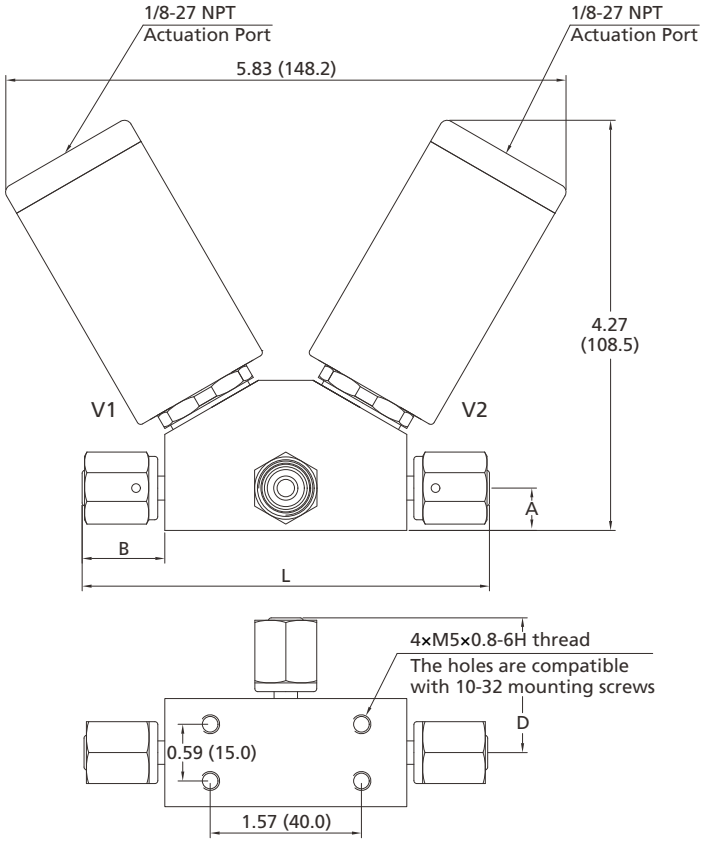
Dimensions

Dimensions, in inches (millimeters), are for reference only.

Manual - Round Handle



Pneumatic



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	C	D	L
DS23□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	2.59 (65.7)	—	4.24 (107.6)
DS23□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	—	1.54 (39.1)	4.24 (107.6)
DS23□□-FNS4-	1/4" Female NPT	0.44 (11.2)	—	—	0.68 (17.3)	3.07 (78.0)

Ordering Number Description

DS236L - FFR4 - RFR4 - FFR4 - VF - COVF2 - CE

Type

23	2 Valves and 3 Ports

Body Material

6L	316L SS
6LV	316L SS VAR

Port 1 Type

FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
FNS	Female NPT

Port 1 Size

4	1/4"

Port 2/3 Type / **Port 2/3 Size**

	Same as Port 1

Specified in the same way as Port 1

Flow Path

VT
VF
VB
WT
WF

Handle and Actuator (V1 and V2)

R	Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic
RC	V1 Handle V2 Normally Closed Pneumatic
RO	V1 Handle V2 Normally Open Pneumatic
CR	V1 Normally Closed Pneumatic V2 Handle
OR	V1 Normally Open Pneumatic V2 Handle
CO	V1 Normally Closed Pneumatic V2 Normally Open Pneumatic
OC	V1 Normally Open Pneumatic V2 Normally Closed Pneumatic

Seat

	PCTFE
V	Polyimide

Process Specification

	FC-01
F2	FC-02
F3	FC-03

Product Certification

	None
CE	CE Certification (For Pneumatic only)

Note:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. For -CE selections, products have "CE" lettering.

Low Pressure/Medium Flow Diaphragm Valves
DR Series

Introduction

DR Series Low Pressure/Medium Flow Diaphragm Valves are suitable for high purity and ultra high purity applications. Featuring an internally springless flow path, these valves offer high cleanliness.

Features

◎ For medium flow applications
◎ Minimal particle generation and minimal dead space
◎ Fully contained seat to provide excellent resistance to swelling and contamination
◎ Cobalt alloy diaphragm with high strength and corrosion resistance to ensure long cycle life
◎ Manual and pneumatic actuators available
◎ Normally closed or normally open position sensors are optional for pneumatically actuated valves

Technical Data

Port Size		3/8" to 1/2" or 10 mm to 12 mm
Flow Coefficient (Cv)		0.70
Orifice Size		0.31 in. (7.9 mm)
Max. Working Pressure		145 psig (10 bar)
Pneumatic Actuator Operating Pressure		60 to 90 psig (4.2 to 6.2 bar)
Temperature		PCTFE: -10 ~ 176 °F (-23 ~ 80 °C) PFA: -10 ~ 302 °F (-23 ~ 150 °C)
Leak Rate (Helium)	**Internal**	≤1×10^{-9} std cm^3/s
	External	≤1×10^{-9} std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

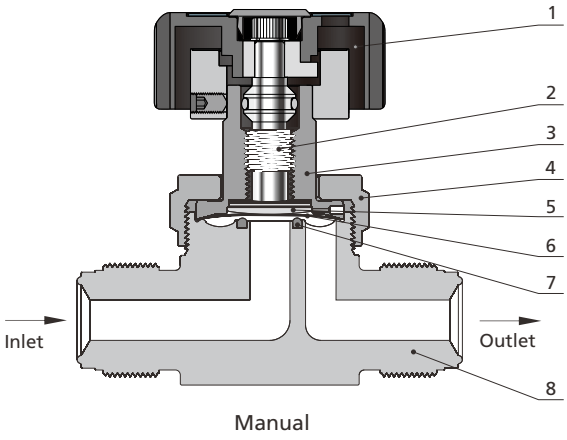
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	240	8.4
50 (3.4)	630	18.6
100 (6.8)	1120	26.6

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)		Ultra High Purity Process (FC-03)
Material	316L SS		316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 10 µin. (0.25 µm)	Ra 5 µin. (0.13 µm)①	Ra 5 µin. (0.13 µm)
Polishing Process	Machine finished	Electropolished	Electropolished

Notes: Refer to page P-01 for a detailed description of Process Specification.
① Wetted surface roughness of valves with FR Series metal gasket face seal connections and tube butt weld connections.

Major Materials of Construction



Manual

Item	Component	Material/Specification
1	Handle	ABS
2	Stem	316 SS/ASTM A479
3	Bonnet	S17400/ASTM A564
4	Bonnet Nut	316 SS/ASTM A479
5	Button	316 SS/ASTM A479
6	Diaphragm (2)	Cobalt Alloy/AMS 5876
7	Seat	PCTFE/ASTM D1430 or PFA/ASTM D3307
8	Body	316L SS or 316L SS VAR

Handles and Actuators

Manual - Round Handle

- Quick, quarter-turn actuation
- Handle with windows to visually indicate open and closed states

Pneumatic

- Normally open, "N.O." marked on the top of the actuator
- Normally closed, "N.C." marked on the top of the actuator

Position Sensors

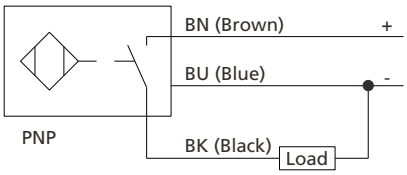
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

Technical Information

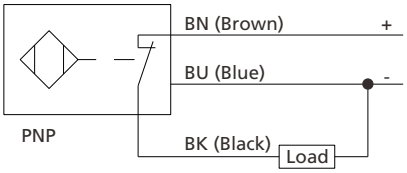
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally open position sensors



Normally closed position sensors



Notes:
1. For normally closed pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.
2. For normally open pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are closed. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are open.

Explosion-proof Position Sensors

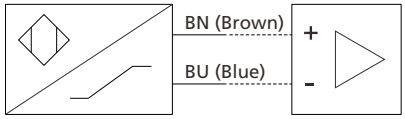
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperatre	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram



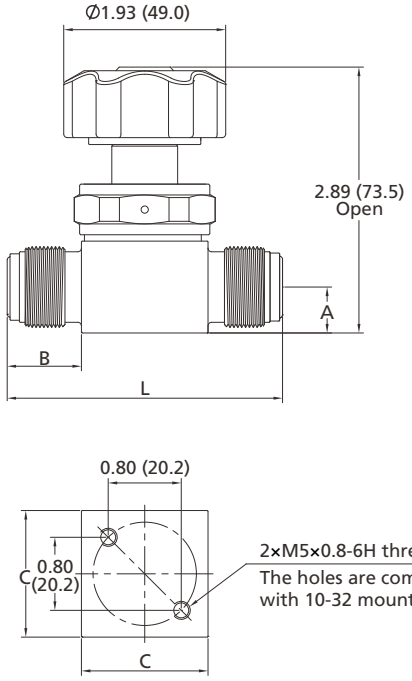
Dimensions and Ordering Information

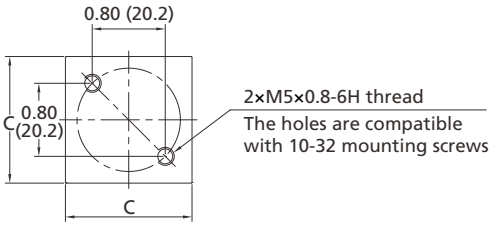
Straight Type

Dimensions

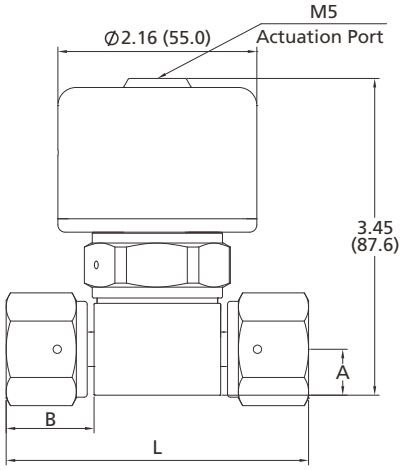
Dimensions, in inches (millimeters), are for reference only.

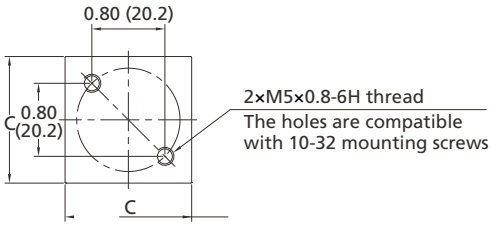
Manual - Round Handle





Pneumatic





Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
DR□□-TB6-	3/8"×0.035" Tube Butt Weld	0.50 (12.7)	0.67 (17.0)	1.38 (35.0)	2.72 (69.0)
DR□□-TB8-	1/2"×0.049" Tube Butt Weld	0.50 (12.7)	0.67 (17.0)	1.38 (35.0)	2.72 (69.0)
DR□□-FFR8-	1/2" Rotatable Female FR Metal Gasket Face Seal Fitting	0.50 (12.7)	0.94 (24.0)	1.38 (35.0)	3.27 (83.0)
DR□□-FR8-	1/2" Integral Male FR Metal Gasket Face Seal Fitting	0.50 (12.7)	0.81 (20.6)	1.38 (35.0)	3.00 (76.2)

Ordering Number Description

DR6L – FFR8 – RFR8 – CAF3MO – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Outlet Type / Outlet Size	
	Same as Inlet

Specified in the same way as Inlet

Inlet Size	
6	3/8"×0.035"
8	1/2" or 1/2"×0.049"
10	10 mm
12	12 mm

Handle and Actuator	
R	Manual-Round Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Seat	
	PCTFE
A	PFA

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

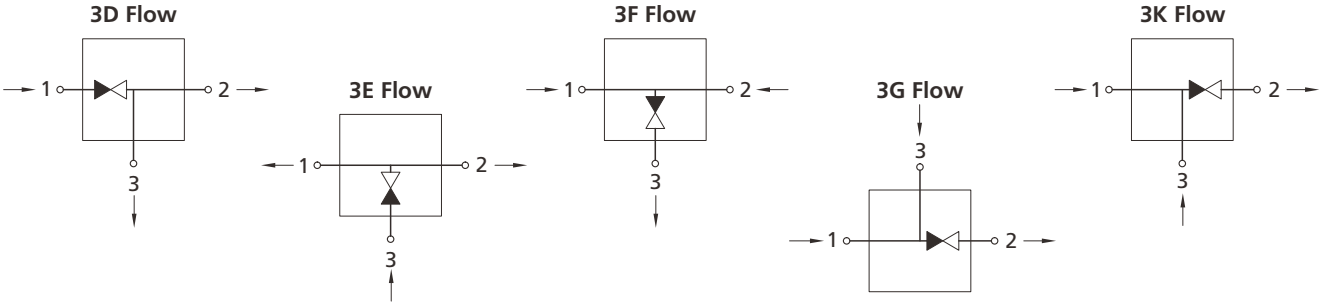
Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

Branch Type

Flow Paths

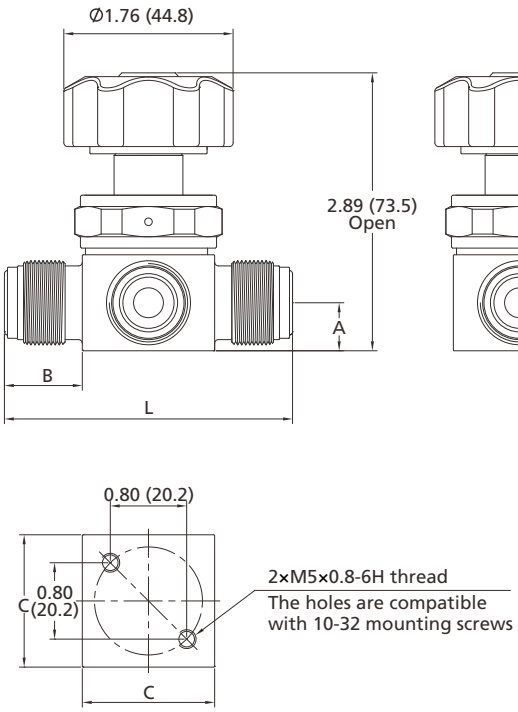
◎ Flow paths as viewed from the top



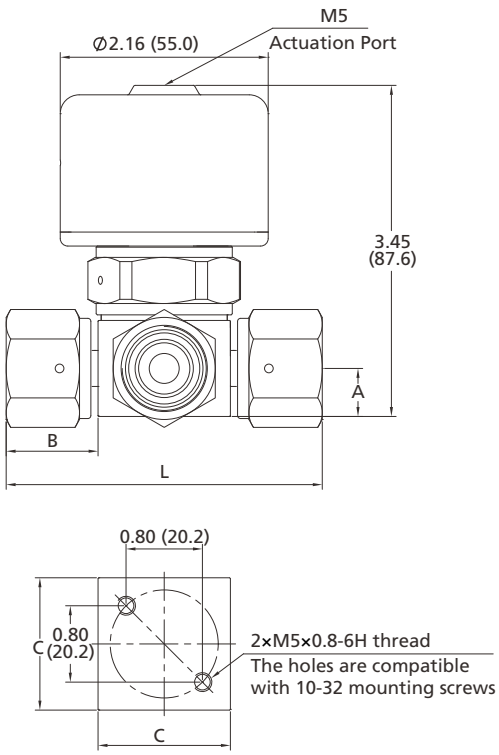
Dimensions

Dimensions, in inches (millimeters), are for reference only.

Manual - Round Handle



Pneumatic



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)				
		A	B	C	D	L
DR□□-TB6-	3/8"×0.035" Tube Butt Weld	0.50 (12.7)	0.67 (17.0)	1.38 (35.0)	0.67 (17.0)	2.72 (69.0)
DR□□-TB8-	1/2"×0.049" Tube Butt Weld	0.50 (12.7)	0.67 (17.0)	1.38 (35.0)	0.67 (17.0)	2.72 (69.0)
DR□□-FFR8-	1/2" Rotatable Female FR Metal Gasket Face Seal Fitting	0.50 (12.7)	0.94 (24.0)	1.38 (35.0)	0.94 (24.0)	3.27 (83.0)
DR□□-RFR8-	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting	0.50 (12.7)	1.34 (34.0)	1.38 (35.0)	1.34 (34.0)	4.05 (103.0)
DR□□-FR8-	1/2" Integral Male FR Metal Gasket Face Seal Fitting	0.50 (12.7)	0.81 (20.6)	1.38 (35.0)	0.81 (20.6)	3.00 (76.2)

Ordering Number Description

DR6L – FFR8 – RFR8 – FR8 – 3D – CAF3MO – CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Port 1 Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting

Port 2/3 Type / Port 2/3 Size	
	Same as Port 1
Specified in the same way as Port 1	

Port 1 Size	
6	3/8"×0.035"
8	1/2" or 1/2"×0.049"
10	10 mm
12	12 mm

Flow Path
3D
3E
3F
3G
3K

Handle and Actuator	
R	Manual-Round Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Seat	
	PCTFE
A	PFA

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

Low Pressure/High Flow Diaphragm Valves

DV Series

Introduction

DV Series Low Pressure/High Flow Diaphragm Valves are suitable for high purity and ultra high purity applications. These valves feature a springless design, compact design, high flow capacity, and a variety of pipeline options.

Features

- ◎ Ideal for high flow applications
- ◎ Metal-to-metal seal
- ◎ Tied-diaphragm design to provide positive stem retraction
- ◎ No springs or threads in wetted areas to ensure clean operation
- ◎ Manual and pneumatic actuators available
- ◎ Position sensors available assembled on normally closed valves

Technical Data

Port Size		1/2" to 1" or 12 mm to 18 mm
Flow Coefficient (Cv)	**Manual**	2.8
	Pneumatic	2.4
Orifice Size		0.5 in. (12.7 mm)
Max. Working Pressure	**Manual**	300 psig (20.6 bar)
	Pneumatic	145 psig (10 bar)
Pneumatic Actuator Operating Pressure		60 to 90 psig (4.2 to 6.2 bar)
Temperature		PCTFE：-10 ~ 150 °F (-23 ~ 65 °C) Polyimide：-10 ~ 250 °F (-23 ~ 121 °C)
Leak Rate (Helium)	**Internal**	≤1×10^{-9} std cm^3/s
	External	≤1×10^{-9} std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

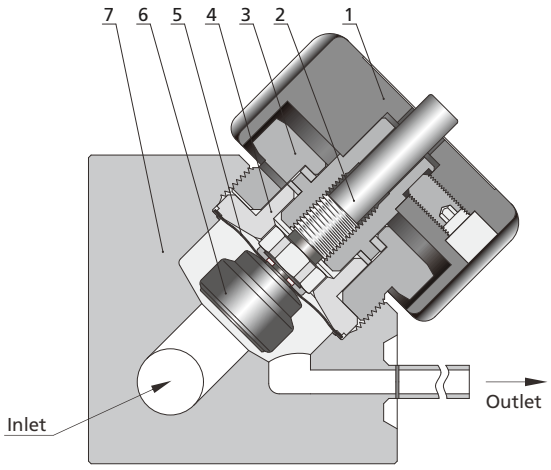
Pressure Drop to Atmosphere psig (bar)	Manual		Pneumatic	
	Air (l/min)	Water (l/min)	Air (l/min)	Water (l/min)
10 (0.68)	870	34	780	29
50 (3.4)	2300	75	2050	64
100 (6.8)	4100	100	3650	91

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material	316L SS, F316L SS	316L SS, F316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 10 µin. (0.25 µm)	Ra 5 µin. (0.13 µm)
Polishing Process	Machine finished	Electropolished

Note: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction



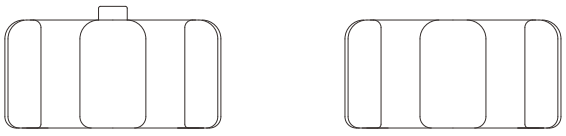
Manual Actuation - Branch Type

Item	Component	Material/Specification
1	Handle	Aluminum
2	Upper Stem	S17400/ASTM A564
3	Bonnet Nut	316 SS/ASTM A479
4	Bonnet	S17400/ASTM A564
5	Diaphragm (3)	Cobalt Alloy/AMS 5876
6	Stem Subassembly	316L SS or 316L SS VAR and PCTFE/ASTM D1430 or Polyimide
7	Body	316L SS or 316L SS VAR or F316L SS

Handles and Actuators

Manual - Round Handle

◎ Upper stem position to indicate open and closed states



OPEN CLOSED

Notes: The upper stem protruding from the handle indicates open state.
The upper stem paralleling to or sinking into the handle indicates closed state.

Pneumatic

◎ Normally open, "N.O." marked on the top of the actuator
◎ Normally closed, "N.C." marked on the top of the actuator

Position Sensors

Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

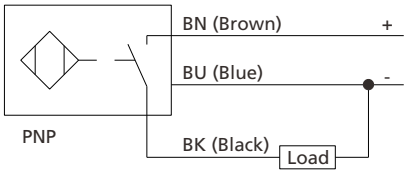
Note: Position sensors are applicable only to normally closed pneumatically actuated valves.

Technical Information

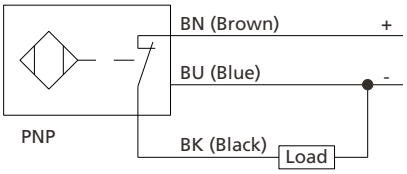
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally open position sensors



Normally closed position sensors



Notes: For normally closed pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.

Explosion-proof Position Sensors

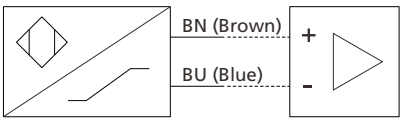
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperatre	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram



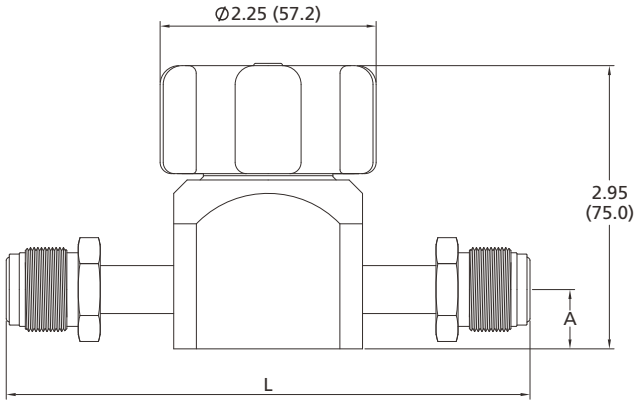
Dimensions and Ordering Information

Straight Type

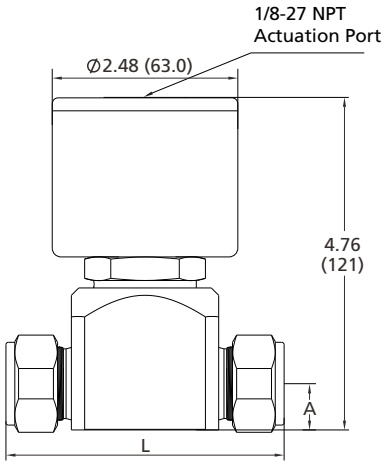
Dimensions

Dimensions, in inches (millimeters), are for reference only.

Manual - Round Handle



Pneumatic



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)	
		A	L
DV□□-TB8-	1/2"×0.049" Tube Butt Weld	0.62 (15.7)	5.91 (150.0)
DV□□-TB12-	3/4"×0.049" Tube Butt Weld	0.62 (15.7)	5.91 (150.0)
DV□□-FR8-	1/2" Integral Male FR Metal Gasket Face Seal Fitting	0.62 (15.7)	5.47 (138.9)
DV□□-FFR8-	1/2" Rotatable Female FR Metal Gasket Face Seal Fitting	0.62 (15.7)	5.47 (138.9)
DV□□-FL8-	1/2" FITOK Tube Fitting	0.62 (15.7)	3.71 (94.2)
DV□□-FL12-	3/4" FITOK Tube Fitting	0.62 (15.7)	3.72 (94.4)

Ordering Number Description

DV6L - FR8 - FL8 - CVF2MO - CE

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting

Inlet Size	
8	1/2" or 1/2"×0.049"
12	12 mm or 3/4" or 3/4"×0.049"
18	18 mm

Outlet Type / Outlet Size	
	Same as Inlet
	Specified in the same way as Inlet

Handle and Actuator	
R	Manual-Round Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Seat	
	PCTFE
V	Polyimide

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Note: MO and MC sensors are only applicable to normally closed pneumatically actuated valves.

Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

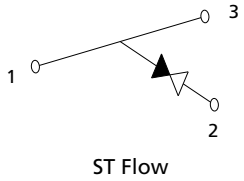
Notes:

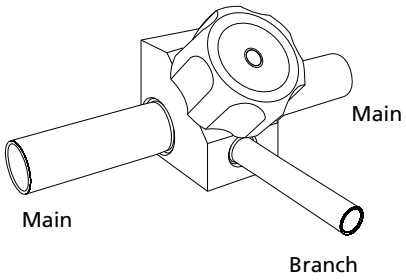
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

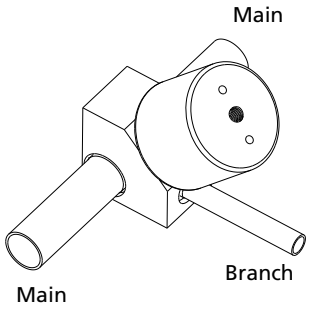
Branch Type

Dimensions

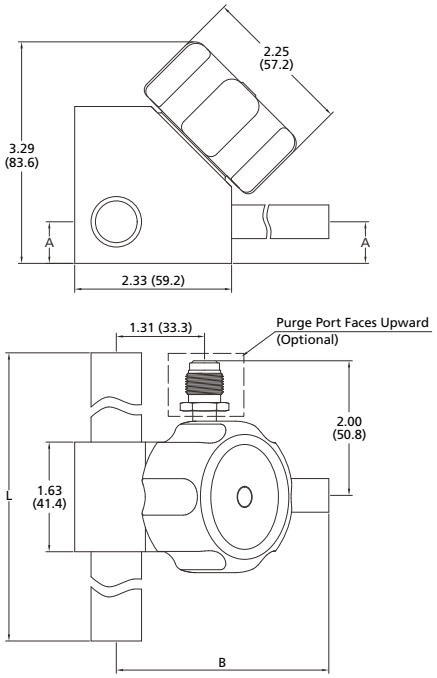
Dimensions, in inches (millimeters), are for reference only.



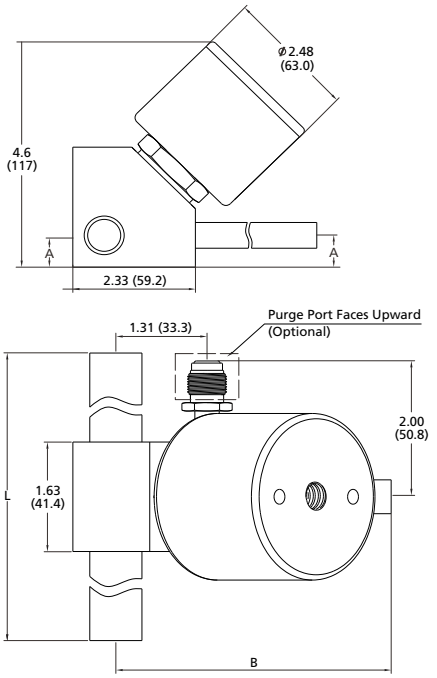




Manual-Round Handle



Pneumatic

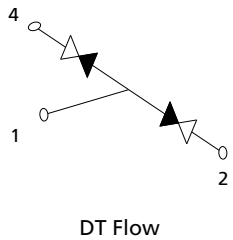


Basic Ordering Number	Connection Type and Size		Dimensions in. (mm)		
	Main	Branch	A	B	L
DV□□-TB8-TB4-	1/2"×0.049" Tube Butt Weld	1/4"×0.035" Tube Butt Weld	0.62 (15.7)	4.69 (119.0)	7.58 (193.0)
DV□□-TB8-TB8-	1/2"×0.049" Tube Butt Weld	1/2"×0.049" Tube Butt Weld			
DV□□-TB8-RFR4-	1/2"×0.049" Tube Butt Weld	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting			
DV□□-TB8-RFR8-	1/2"×0.049" Tube Butt Weld	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting			
DV□□-TB12-TB8-	3/4"×0.049" Tube Butt Weld	1/2"×0.049" Tube Butt Weld			
DV□□-TB12-RFR8-	3/4"×0.049" Tube Butt Weld	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting			
DV□□-TB16-TB8-	1"×0.065" Tube Butt Weld	1/2"×0.049" Tube Butt Weld			
DV□□-TB16-RFR8-	1"×0.065" Tube Butt Weld	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting			

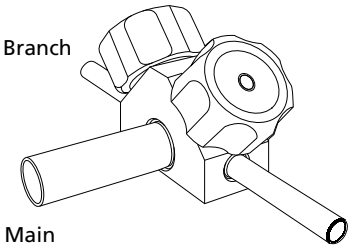
Branch Type

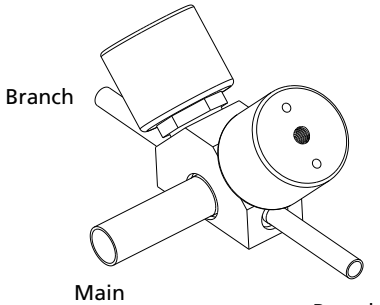
Dimensions

Dimensions, in inches (millimeters), are for reference only.

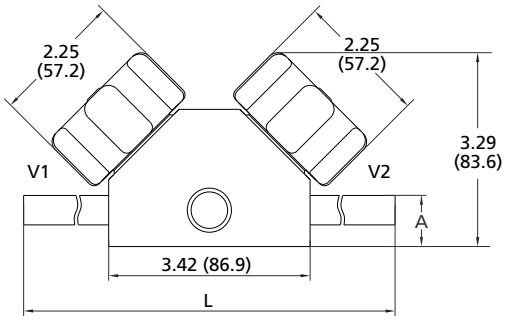


DT Flow

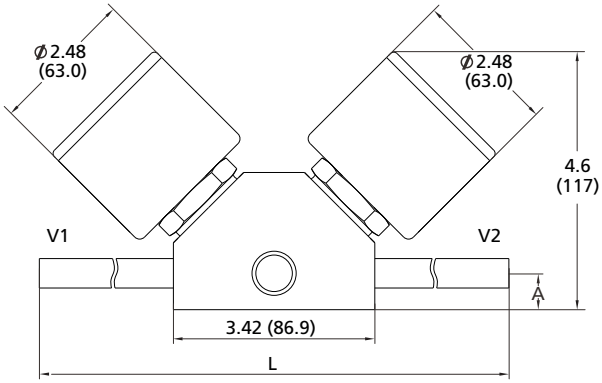


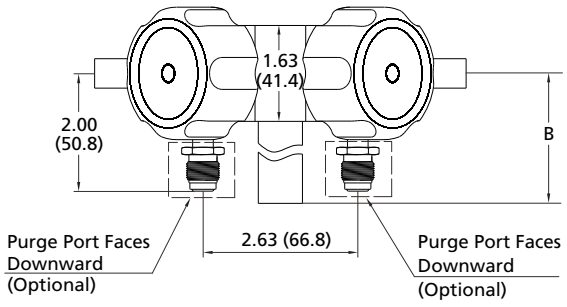


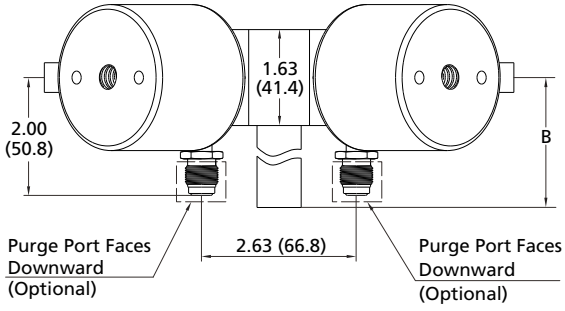
Manual-Round Handle



Pneumatic





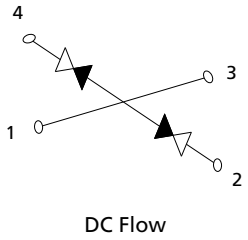


Basic Ordering Number	Connection Type and Size		Dimensions in. (mm)		
	Main	Branch	A	B	L
DV□□-TB12-TB8-	3/4"×0.049" Tube Butt Weld	1/2"×0.049" Tube Butt Weld	0.62 (15.7)	3.79 (96.3)	9.38 (238.0)
DV□□-TB12-RFR8-	3/4"×0.049" Tube Butt Weld	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting			
DV□□-TB16-TB8-	1"×0.065" Tube Butt Weld	1/2"×0.049" Tube Butt Weld			
DV□□-TB16-RFR8-	1"×0.065" Tube Butt Weld	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting			

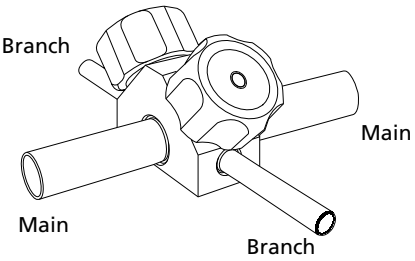
Branch Type

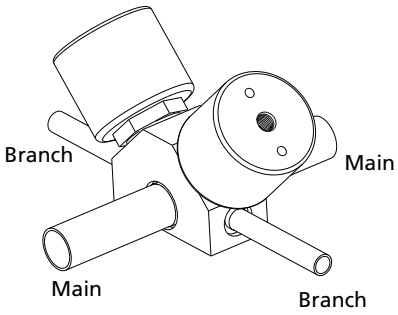
Dimensions

Dimensions, in inches (millimeters), are for reference only.

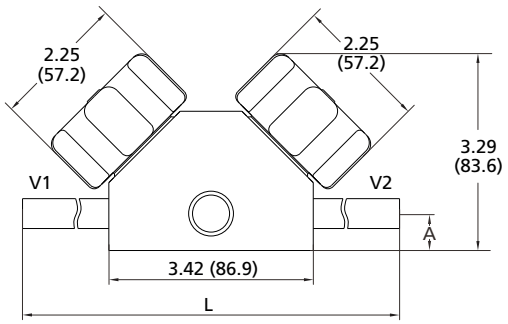


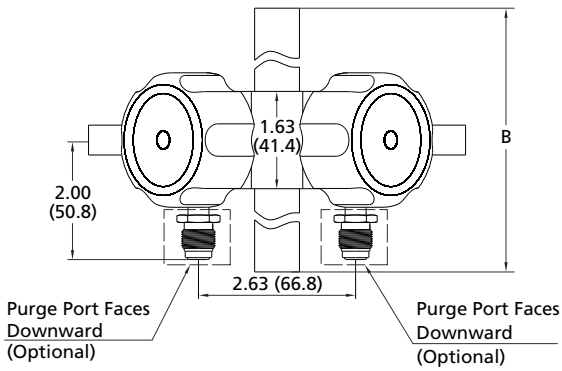
DC Flow



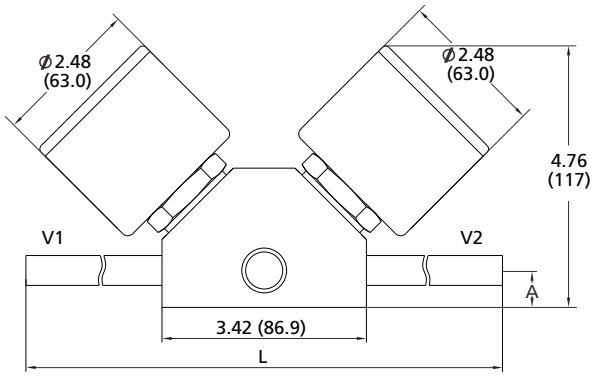


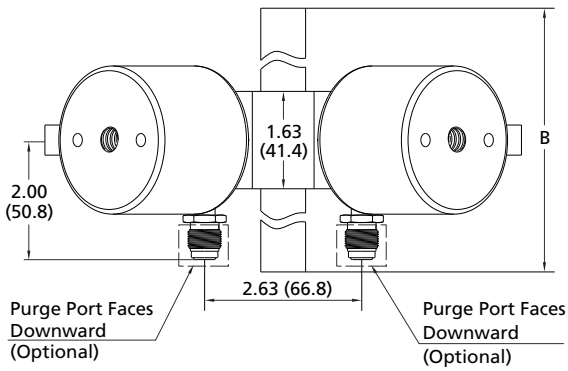
Manual-Round Handle





Pneumatic





Basic Ordering Number	Connection Type and Size		Dimensions in. (mm)		
	Main	Branch	A	B	L
DV□□-TB8-TB8-	1/2"×0.049" Tube Butt Weld	1/2"×0.049" Tube Butt Weld	0.62 (15.7)	7.58 (193.0)	9.38 (238.0)
DV□□-TB8-RFR8-	1/2"×0.049" Tube Butt Weld	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting			
DV□□-TB12-TB8-	3/4"×0.049" Tube Butt Weld	1/2"×0.049" Tube Butt Weld			
DV□□-TB12-RFR8-	3/4"×0.049" Tube Butt Weld	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting			
DV□□-TB16-TB8-	1"×0.065" Tube Butt Weld	1/2"×0.049" Tube Butt Weld			
DV□□-TB16-RFR8-	1"×0.065" Tube Butt Weld	1/2" Rotatable Male FR Metal Gasket Face Seal Fitting			

Ordering Number Description

DV6L - TB12 - TB8 - DC - P2 - COVF2MO - CE

Body Material

6L	316L SS
6LV	316L SS VAR

Main Connection Type

TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld

Main Connection Size

8	1/2" or 1/2"×0.049"
12	3/4" or 3/4"×0.049"
16	1"×0.065"

Branch Connection Type

TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
RFR	Rotatable Male FR Fitting

Branch Connection Size

4	1/4" or 1/4"×0.035"
8	8 mm or 1/2" or 1/2"×0.049"
12	12 mm

Flow Path

ST
DT
DC

Purge Port Location

	None
P0U	Inlet Side, Purge Port Faces Upward
P0D	Inlet Side, Purge Port Faces Downward
P1U	Outlet Side, Purge Port Faces Upward
P1D	Outlet Side, Purge Port Faces Downward
P2U	Outlet and Inlet, Purge Port Faces Upward
P2U	Outlet and Inlet, Purge Port Faces Downward

Handle and Actuator (V1 and V2)

R	Manual-Round Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic
RC	V1 Handle V2 Normally Closed Pneumatic
RO	V1 Handle V2 Normally Open Pneumatic
CR	V1 Normally Closed Pneumatic V2 Handle
OR	V1 Normally Open Pneumatic V2 Handle
CO	V1 Normally Closed Pneumatic V2 Normally Open Pneumatic
OC	V1 Normally Open Pneumatic V2 Normally Closed Pneumatic

Seat

	PCTFE
V	Polyimide

Process Specification

	FC-01
F2	FC-02
F3	FC-03

Position Sensor

	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Note: MO and MC sensors are only applicable to normally closed pneumatically actuated valves.

Product Certification

	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

Notes:

1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.
3. The orientation of the purge port follows the dimension diagrams, all viewed from the top perspective.

Low Pressure/Ultra High Flow Diaphragm Valves

DL Series

Introduction

DL Series Low Pressure/Ultra High Flow Diaphragm Valves are suitable for high purity and ultra high purity applications. Featuring a springless design, these valves are available with a cast body or a stainless steel bar stock body, and offer optional purge ports.

Features

- Ideal for ultra high flow applications
- No internally wetted threads or springs which minimizes particle generation and particle entrapment for high purity.
- PCTFE stem tip insert for leak-tight shutoff

Technical Data

Port Size		3/4" to 1" or 23 mm to 25 mm
Flow Coefficient (Cv)	**Manual**	13
	Pneumatic	6.5
Orifice Size		1.125 in. (28.6 mm)
Max. Working Pressure		300 psig (20.6 bar)
Pneumatic Actuator Operating Pressure		80 to 95 psig (5.5 to 6.5 bar)
Temperature		PCTFE: -10 ~ 150 °F (-23 ~ 65 °C) Polyimide: -10 ~ 250 °F (-23 ~ 121 °C)
Leak Rate (Helium)	**Internal**	$\leqslant 1\times10^{-9}$ std cm^3/s
	External	$\leqslant 1\times10^{-9}$ std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

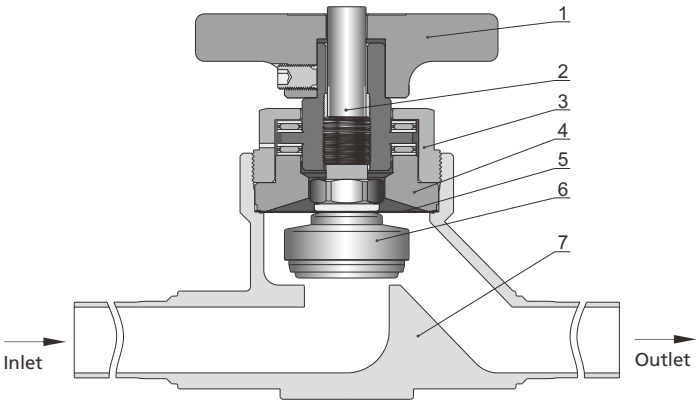
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10(0.68)	3900	150
50(3.4)	11000	340
100(6.8)	19500	490

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material	316L SS, CF3M	
Wetted Surface Roughness	Ra 20 µin. (0.5 µm)	Ra 5 µin. (0.13 µm) (Bar Stock) Ra 10 µin. (0.25 µm) (Casting)
Polishing Process	Machine finished	Electropolished

Note: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction

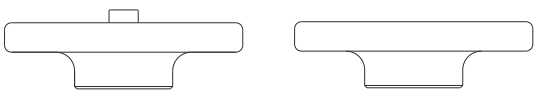


Item	Component	Material/Specification
1	Handle	Aluminum
2	Upper Stem	316 SS/ASTM A479
3	Bonnet Nut	316 SS/ASTM A479
4	Bonnet	316 SS/ASTM A479
5	Diaphragm (3)	Cobalt Alloy/AMS 5876
6	Stem Subassembly	316L SS and PCTFE/ASTM D1430 or Polyimide
7	Body	316L SS or CF3M

Handles and Actuators

Handle

- Five and a half turns to operate from fully open to closed
- Upper stem position to indicate open and closed states



Notes:
The upper stem protruding from the handle indicates open state.
The upper stem paralleling to or sinking into the handle indicates closed state.

Pneumatic

- Normally closed, "N.C." marked on the side of the actuator
- Actuator port 1/8-27 NPT

Position Sensors

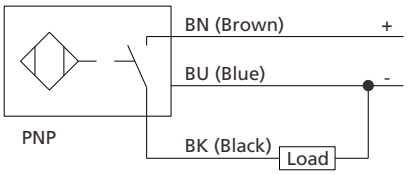
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

Technical Information

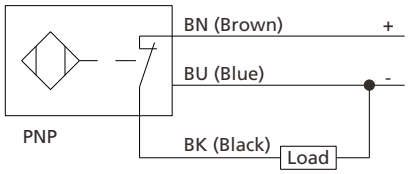
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally open position sensors



Normally closed position sensors



Notes: For normally closed pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.

Explosion-proof Position Sensors

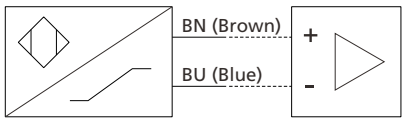
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperatre	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

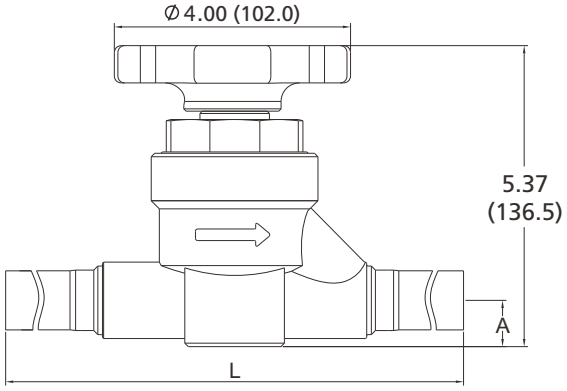


Dimensions

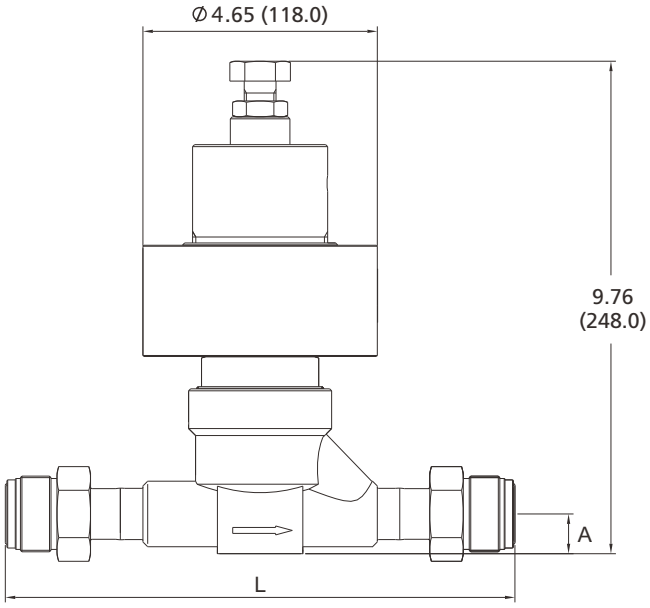
Dimensions, in inches (millimeters), are for reference only.

Manual - Round Handle

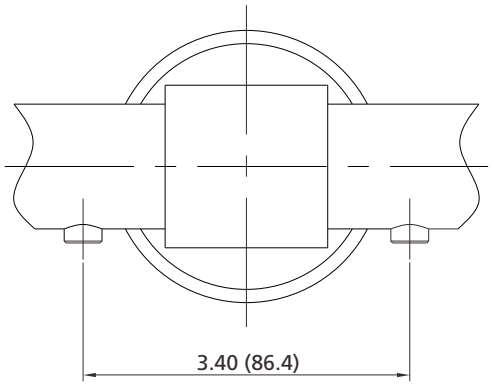
Cast Body Valves



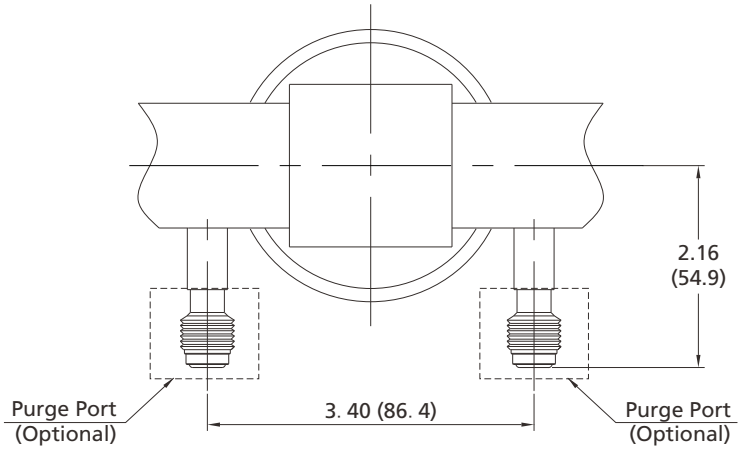
Pneumatic



No Purge Ports

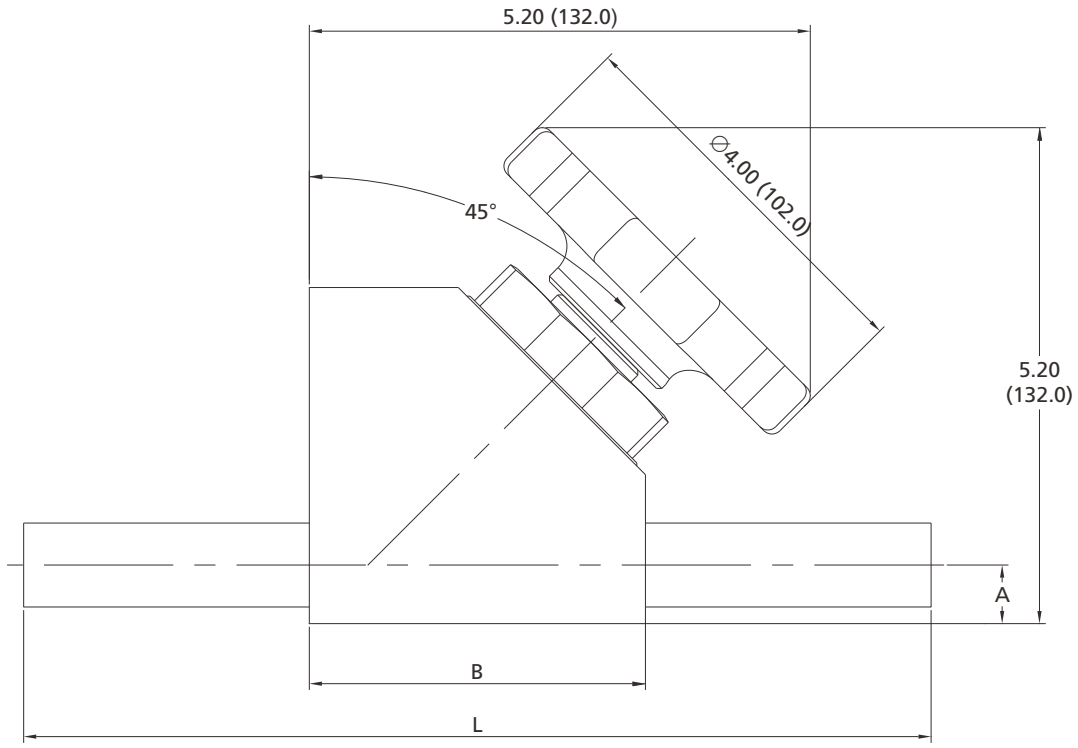


1/4" Integral Male FR Metal Gasket Face Seal Fitting

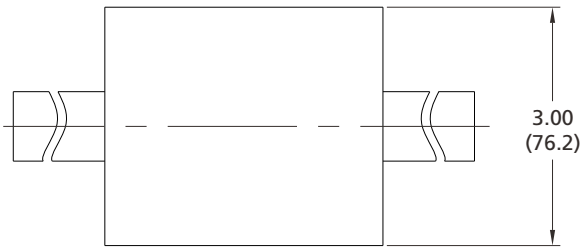


Basic Ordering Number	End Connections		Dimensions, in. (mm)	
	Type	Size	A	L
DL6L-FL12-	FITOK Tube Fitting	3/4"	0.79 (20.0)	8.27 (210.0)
DL6L-FL16-		1"		8.46 (215.0)
DL6L-ML25-		25 mm		8.63 (219.0)
DL6L-TB16-	Fractional Tube Butt Weld	1"×0.065"		10.90 (277.0)
DL6L-MTB23-	Metric Tube Butt Weld	23×1.5 mm		
DL6L-MTB25-		25×1.5 mm		
DL6L-FR16-	Integral Male FR Metal Gasket Face Seal Fitting	1"		10.04 (255.0)

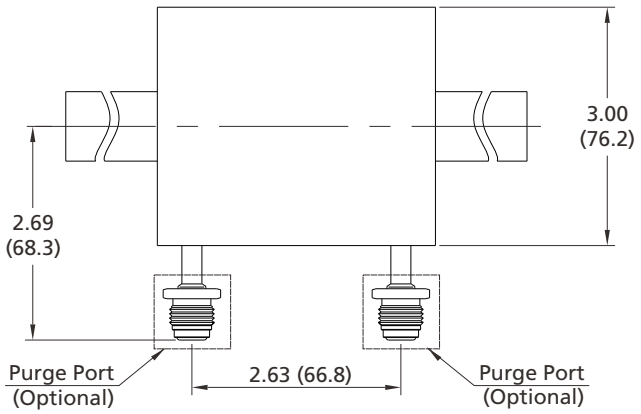
Bar Stock Valves



No purge ports



1/4" Rotatable Male FR Metal Gasket Face Seal Fitting



Basic Ordering Number	End Connections		Dimensions, in. (mm)		
	Type	Size	A	B	L
DL6L-TB12-B-	Fractional Tube Butt Weld	3/4"×0.049"	0.61 (15.5)	3.50 (88.9)	9.46 (240.0)
DL6L-TB16-B-		1"×0.065"			

Ordering Number Description

DL6L – TB16 – FL16 – BP2 – CVF2MC – CE

Body Material	
6L	CF3M
	316L SS

Inlet Size	
12	3/4" or 3/4"x0.049"
16	1" or 1"×0.065"
23	23×1.5 mm
25	25 mm or 25×1.5 mm

Outlet Type / Outlet Size	
	Same as Inlet
	Specified in the same way as Inlet

Inlet Type	
FL	Fractional Tube Fitting
ML	Metric Tube Fitting
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting

Valve Type	
	Cast Body
B	Bar Stock

Purge Port Location	
	None
P0	Inlet Side
P1	Outlet Side
P2	Inlet and Outlet

Handle and Actuator	
R	Manual
C	Normally Closed Pneumatic

Seat	
	PCTFE
V	Polyimide

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Note: MO and MC sensors are only applicable to normally closed pneumatically actuated valves.

Product Certification	
	None
CE	CE Certification (For Pneumatic Only)
AX	ATEX Certification (For Pneumatic Only)

Notes:

1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

High Pressure/High Flow Diaphragm Valves

DF Series

Features

DF Series High Pressure/High Flow Diaphragm Valves are suitable for high purity and ultra high purity applications. Featuring an easily replaceable seat, these valves are ideal for high pressure and high flow applications.

Features

- ◎ Ideal for high flow applications
- ◎ Metal-to-metal seal
- ◎ Spring type design
- ◎ Cobalt alloy diaphragm with high strength and corrosion resistance to ensure long cycle life
- ◎ Normally closed or normally open position sensors optional for pneumatically actuated valves

Technical Data

Port Size		3/8" to 1/2" or 8 mm to 12 mm
Flow Coefficient (Cv)		0.80
Orifice Size		0.31 in. (8.0 mm)
Max. Working Pressure	**Handle**	3500 psig (241 bar)
	Pneumatic	3000 psig (206 bar)
Max. Differential Back Pressure①		150 psig (10.3 bar)
Pneumatic Actuator Operating Pressure		60 to 90 psig (4.2 to 6.2 bar)
Temperature		PCTFE: -10 ~ 150 °F (-23 ~ 65 °C) Polyimide: -10 ~ 250 °F (-23 ~ 121 °C)
Leak Rate (Helium)	**Internal**	$\leqslant 4\times10^{-9}$ std cm^3/s
	External	$\leqslant 4\times10^{-9}$ std cm^3/s

① Differential back pressure is equal to the outlet pressure minus the inlet pressure. When the differential back pressure is greater than 150 psig (10.3 bar), the valve will not open. As the force of the differential back pressure acting on the valve stem is downward when closing and is greater than the spring force, the valve stem cannot be lifted.

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

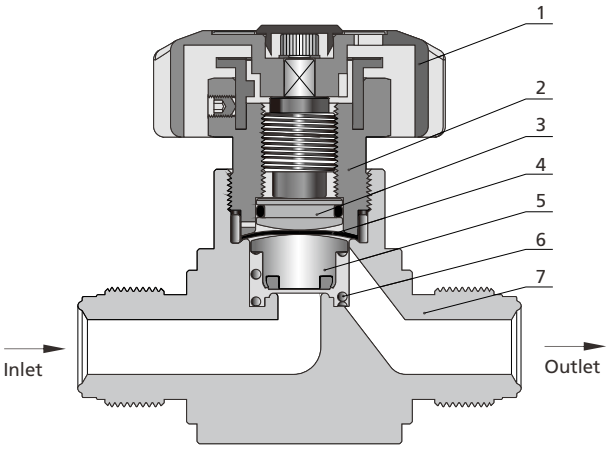
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	274	9.5
50 (3.4)	733	21.5
100 (6.8)	1300	30.3

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material	316L SS	
Wetted Surface Roughness	Ra 20 µin. (0.5 µm)	Ra 10 µin. (0.25 µm)
Polishing Process	Machine finished	Electropolished

Note: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction



Manual Model

Item	Component	Material/Specification
1	Handle	Aluminum
2	Bonnet Nut	S17400/ASTM A564
3	Button	316 SS/ASTM A479
4	Diaphragm (5)	Cobalt Alloy (3) /AMS 5876 + C17200 (2) /ASTM B194
5	Stem Subassembly	316L SS and PCTFE/ASTM D1430 or Polyimide
6	Spring	316 SS/ASTM A313
7	Body	316L SS

Handles and Actuators

Manual - Round Handle

- One-half turn to operate from fully open to closed
- Handle with window to visually indicate open and closed states

Pneumatic

- Normally open, "N.O." marked on the top of the actuator
- Normally closed, "N.C." marked on the top of the actuator

Position Sensors

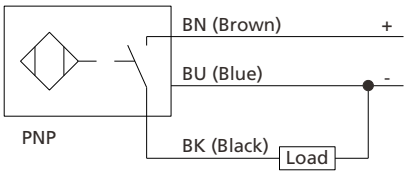
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

Technical Information

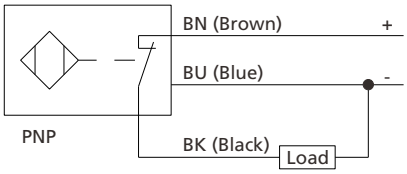
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally open position sensors



Normally closed position sensors



Notes:
1. For normally closed pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.
2. For normally open pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are closed. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are open.

Explosion-proof Position Sensors

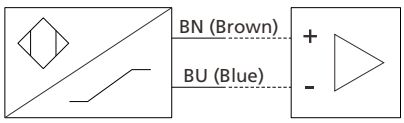
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperatre	-13 ~ 158 °F (-25 ~ 70 °C)

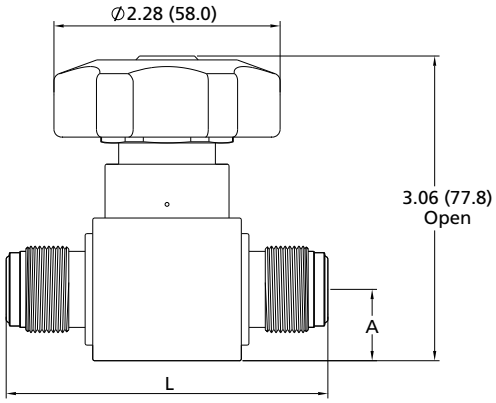
Wiring Diagram



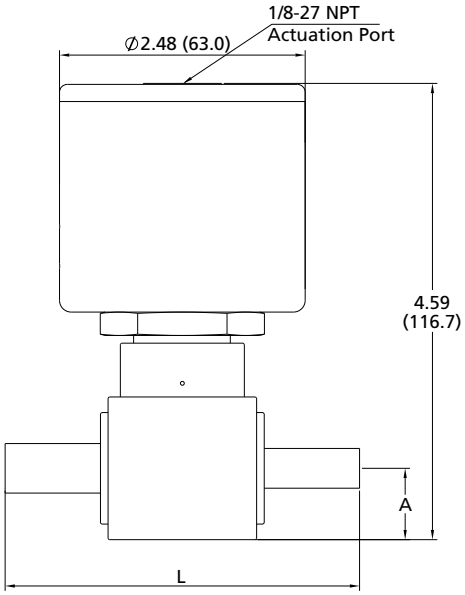
Dimensions

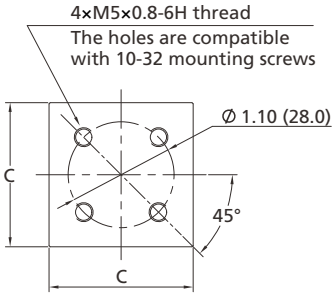
Dimensions, in inches (millimeters), are for reference only.

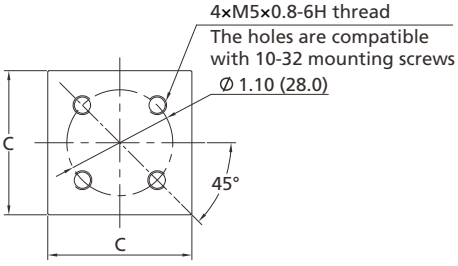
Manual - Round Handle



Pneumatic







Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)		
		A	C	L
DF6L-TB6-	3/8"×0.035" Tube Butt Weld	0.71 (18.0)	1.50 (38.1)	3.58 (90.9)
DF6L-TB8-	1/2"×0.049" Tube Butt Weld			3.58 (90.9)
DF6L-FR8-	1/2" Integral Male FR Metal Gasket Face Seal Fitting			3.25 (82.5)
DF6L-FFR8-	1/2" Rotatable Female FR Metal Gasket Face Seal Fitting			3.89 (98.8)
DF6L-FL6-	3/8" FITOK Tube Fitting			3.27 (83.0)
DF6L-FL8-	1/2" FITOK Tube Fitting			3.47 (88.2)
DF6L-FNS8-	1/2" Female NPT			3.30 (84.0)

Ordering Number Description

DF6L – FR8 – FL8 – D – CVF2MO – CE

Body Material	
6L	316L SS

Inlet Size	
6	3/8" or 3/8"×0.035"
8	8 mm or 1/2" or 1/2"×0.049"
10	10 mm
12	12 mm

Outlet Type / Outlet Size	
	Same as Inlet
	Specified in the same way as Inlet

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting
NS	Male NPT
FNS	Female NPT

Differential Back Pressure	
	Max. Differential Back Pressure 150 psig
D	Bidirectional flow, unaffected by differential back pressure (Pneumatic is only applicable to Polyimide seat)

Handle and Actuator	
R	Manual-Round Handle
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Seat	
	PCTFE
V	Polyimide

Position Sensor	
	None
MO	Normally Open Position Sensor
MC	Normally Closed Position Sensor

Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATXE certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.
3. The orientation of the purge port follows the dimension diagrams, all viewed from the top perspective.

Economic Diaphragm Valves

DE Series

Introduction

DE series economic diaphragm valves are typical products for ultra high purity gas fluid systems. while maintaining the same basic performance by using the same materials, cleaning and packaging processes as the other series of FITOK diaphragm valves. FITOK's advance manufacturing processes and stringent quality control ensure the products meet the application needs of ultra high purity gas fluid systems for the semiconductor industry.

Features

◎ Minimal particle generation and minimal dead space
◎ Cobalt alloy diaphragm with high strength and corrosion resistance to ensure long cycle life
◎ No springs or threads in wetted areas improves cleanliness

Technical Data

Port Size		1/4"
Flow Coefficient (Cv)		0.27
Orifice Size		0.16 in. (4.1 mm)
Working Pressure		Vacuum to 150 psig (10 bar)
Pneumatic Actuator Operating Pressure		60 ~ 90 psig (4.2 ~ 6.2 bar)
Temperature		-10 ~ 176 °F (-23 ~ 80 °C)
Leak Rate (Helium)	**Internal**	$\leqslant 1\times10^{-9}$ std cm^3/s
	External	$\leqslant 1\times10^{-9}$ std cm^3/s

Flow Data

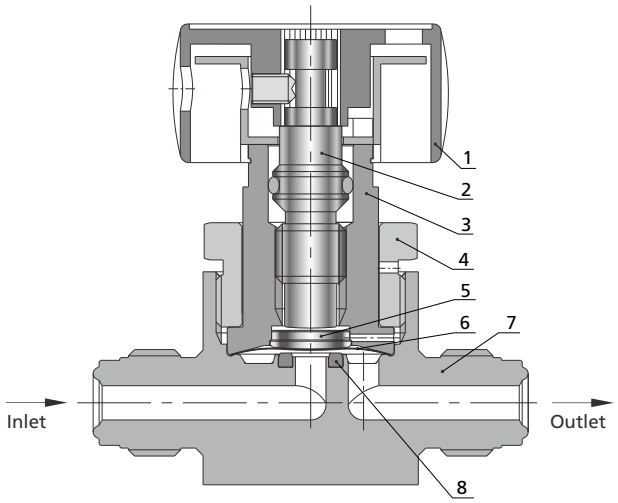
Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	86	3.2
50 (3.4)	230	7.2
100 (6.8)	410	10.2

Process Specification

Item \ Process Specification	Ultra High Purity Process (FC-03)
Material	316L SS
Wetted Surface Roughness	Ra 5 µin. (0.13 µm)
Polishing Process	Electropolished
Cleaning	Ultra high purity cleaning in continuously monitored ultrasonic cleaning system with deionized water
Assembly Environment	ISO Class 4 (FS 209E Class 10 equivalent) cleanroom
Packaging	Double bagged in cleanroom

Major Materials of Construction



Item	Component	Material / Specification
1	Handle	Aluminum
2	Stem	316 SS/ASTM A479
3	Bonnet	S17400/ASTM A564
4	Bonnet Nut	316 SS/ASTM A479
5	Button	316 SS/ASTM A479
6	Diaphragm	Cobalt Alloy/AMS 5876
7	Body	316L SS
8	Seat	PCTFE/ASTM D1430

Handles and Actuators

Manual - Round Handle

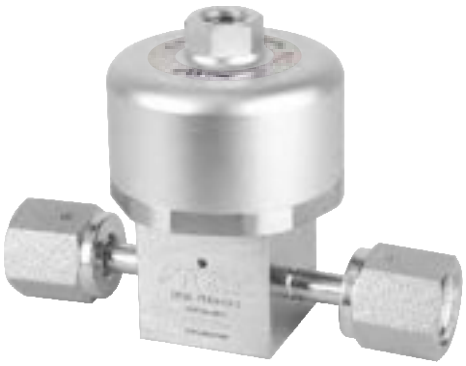
◎ Quick, half-turn actuation
◎ Handle with window to visually indicate open and closed states

OPEN

CLOSED

Normally Closed Pneumatic

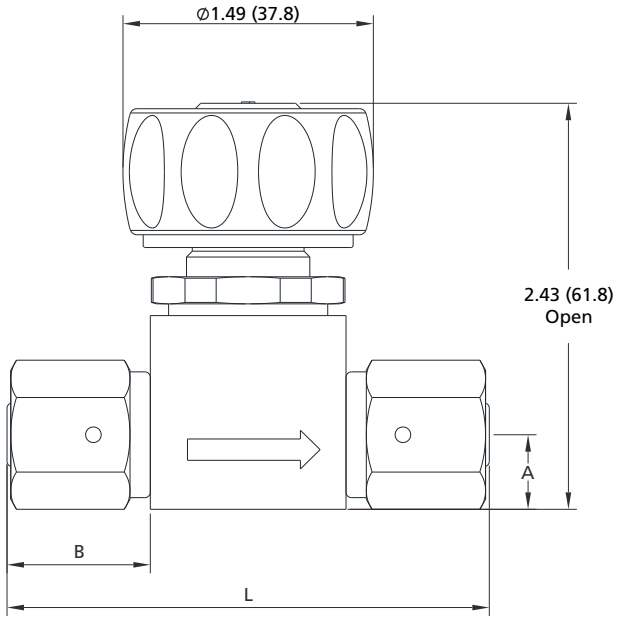
◎ Normally Closed, “N.C.” marked on the top of the actuator



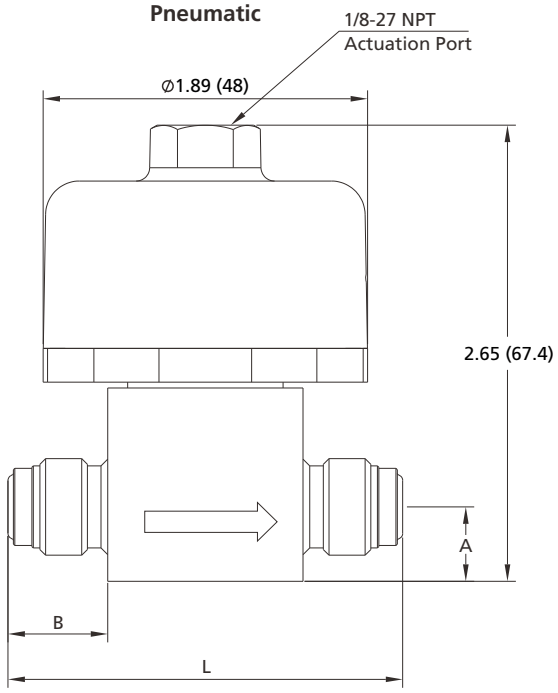
Dimensions and Ordering Information

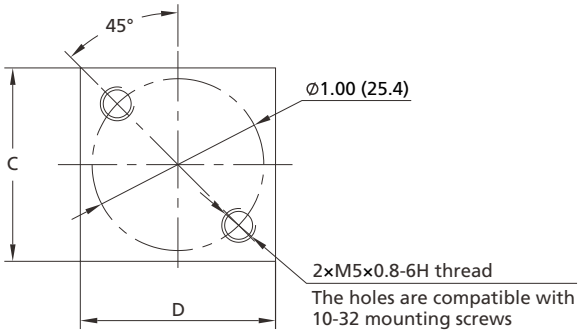
Dimensions, in inches (millimeters), are for reference only.

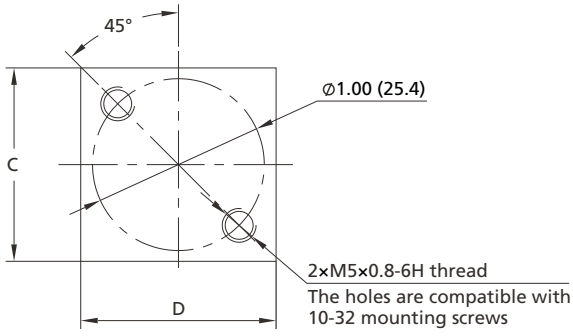
Manual - Round Handle



Pneumatic







Ordering Number	Connection Type and Size	Dimensions, in. (mm)				
		A	B	C	D	L
DE6L-FFR4-RF3	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.43 (11)	0.82 (20.9)	1.13 (28.6)	1.14 (28.9)	2.78 (70.6)
DE6L-FFR4-CF3						
DE6L-FR4-RF3	1/4" Integral Male FR Metal Gasket Face Seal Fitting		0.58 (14.7)			2.30 (58.4)
DE6L-FR4-CF3						

Part Number Description

DE6L - FFR4 - CF3

Body Material		Port Type		Port Size		Handle and Actuator		Process Specification	
6L	316L SS	FR	Integral Male FR Metal Gasket Face Seal Fitting	4	1/4"	R	Manual - Round Handle	F3	FC-03
		FFR	Rotatable Female FR Metal Gasket Face Seal Fitting			C	Normally Closed Pneumatic		

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.

High Temperature Diaphragm Valves
DK Series

Introduction

DK series diaphragm valves are designed and manufactured to Ultra-High Purity (UHP) standards, ensuring the complete absence of non-metallic materials, such as resins, in gas wetted areas. These valves represent the pinnacle of metal diaphragm valve technology and can operate at temperatures up to 250°C. This makes them ideal for applications such as Metal-Organic Chemical Vapor Deposition (MOCVD) systems and corrosive media delivery systems.

Features

◎ Thermal immersion design for use in high temperature up to 482 °F (250 °C)
◎ Metal seat to provide excellent resistance to swelling and contamination
◎ Cobalt alloy diaphragm with high strength and corrosion resistance to ensure long cycle life
◎ All-Metal wetted parts with broad chemical compatibility
◎ Minimal particle generation and minimal dead space, easy to purge

Technical Data

Port Size		1/4" to 3/8" or 6 mm to 8 mm
Flow Coefficient (Cv)		0.27
Orifice Size		0.16 in. (4.1 mm)
Max. Working Pressure		145 psig (10 bar)
Pneumatic Actuator Operating Pressure		72 ~ 101 psig (5 ~ 7 bar)
Temperature	**Body**	14 ~ 482 °F (-10 ~ 250 °C)
	Actuator	14 ~ 482 °F (-10 ~ 250 °C)
Leak Rate (helium)	**Internal**	$\leqslant 3\times10^{-9}$ std cm^3/s
	External	$\leqslant 3\times10^{-9}$std cm^3/s

Flow Data

Air @ 70 °F (21 °C)
Water @ 60 °F (16 °C)

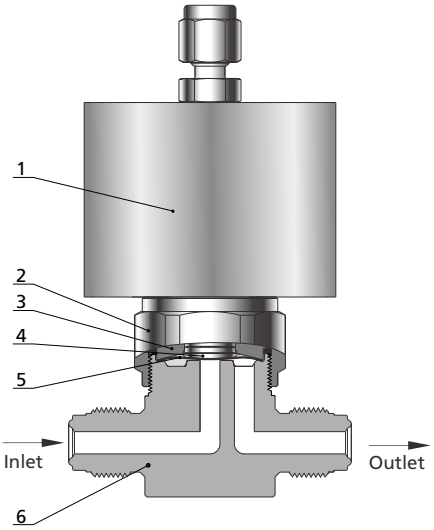
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	86	3.2
50 (3.4)	230	7.2
100 (6.8)	410	10.2

Process Specification

Item \ Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)		Ultra High Purity Process (FC-03)
Material	316L SS		316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 10 µin. (0.25 µm)	Ra 5 µin. (0.13 µm)①	Ra 5 µin. (0.13 µm)
Polishing Process	Machine finished	Electropolished	Electropolished

Notes: Refer to page P-01 for a detailed description of Process Specification.
① Wetted surface roughness of valves with FR Series metal gasket face seal connections and tube butt weld connections.

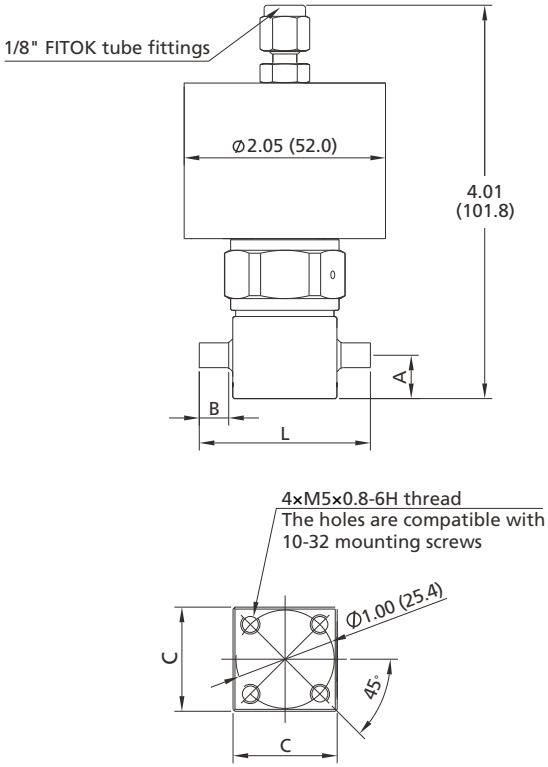
Major Materials of Construction



Item	Component	Material/Specification
1	Actuator	316 SS/ASTM A479
2	Bonnet Nut	316 SS/ASTM A479
3	Bonnet	S17400/ASTM A564
4	Button	316 SS/ASTM A479
5	Diaphragm (2)	Cobalt Alloy/AMS 5876
6	Body	316L SS or 316L SS VAR

Dimensions and Ordering Information

Dimensions, in inches (millimeters), are for reference only.



Basic Ordering Number	Connection Type and Size	Dimensions, in. (mm)			
		A	B	C	L
DK☐☐-TB4-4-	1/4"×0.035" Tube Butt Weld	0.44 (11.2)	0.30 (7.6)	1.06 (26.9)	1.74 (44.2)
DK☐☐-TB6-4-	3/8"×0.035" Tube Butt Weld	0.44 (11.2)	0.26 (6.6)	1.06 (26.9)	1.74 (44.2)
DK☐☐-FFR4-4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DK☐☐-RFR4-4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.86 (21.8)	1.06 (26.9)	2.78 (70.6)
DK☐☐-FR4-4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.62 (15.7)	1.06 (26.9)	2.30 (58.4)

Ordering Number Description

DK6L - TB4 - FR4 - 4 - CF3

Body Material	
6L	316L SS
6LV	316L SS VAR

Inlet Type	
TB	Fractional Tube Butt Weld
MTB	Metric Tube Butt Weld
FR	Integral Male FR Metal Gasket Face Seal Fitting
FFR	Rotatable Female FR Metal Gasket Face Seal Fitting
RFR	Rotatable Male FR Metal Gasket Face Seal Fitting
FL	Fractional Tube Fitting
ML	Metric Tube Fitting

Outlet Type / Outlet Size	
	Same as Inlet
Specified in the same way as Inlet	

Inlet Size	
4	1/4" or 1/4"×0.035"
6	6 mm or 3/8"×0.035"
8	8 mm

Orifice	
4	0.16" (4.1 mm)

Actuator Type	
C	Normally Closed Pneumatic Actuator
O	Normally Open Pneumatic Actuator

Process Specification	
	FC-01
F2	FC-02
F3	FC-03

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.
Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.

Diaphragm Valves

DI/DIH Series

Introduction

DI and DIH series diaphragm valves for integrated gas systems (IGS) are available with surface-mount port options, using SEMI-compliant surface-mounting. Featuring either W-seal or C-seal metal hard seals between the valve and the substrate, these diaphragm valves can be installed in integrated gas systems.

Features

◎ Cobalt alloy diaphragm improves strength and corrosion resistance
◎ W-seal and C-seal optional
◎ No packing diaphragm seal ensures high purity
◎ No dead zone for easy purging
◎ Pneumatic actuator optional
◎ Wetted components electropolished to a surface finish of 5 µin. (0.13 µm) Ra max.

Technical Data

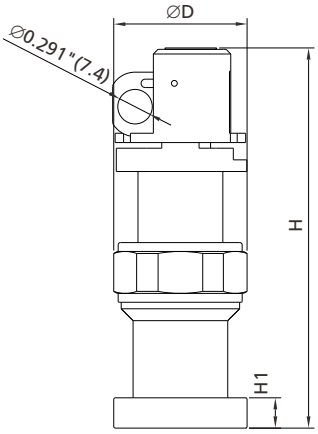
Max. Working Pressure	**Manual**	145 psig (10 bar)
	Pneumatic	
Working Temperature		PCTFE: 14~176°F (-10~80°C) PFA: 14~302°F (-10~150°C)
Flow Coefficient (Cv)		0.2(DI), 0.3(DIH)
Pneumatic Actuator Working Pressure		60~90 psig (4.2~6.2 bar)
Leakage Rate (Helium)	**Internal**	$\leqslant 1\times10^{-9}$std cm^3/s
	External	$\leqslant 1\times10^{-9}$std cm^3/s

Process Specification

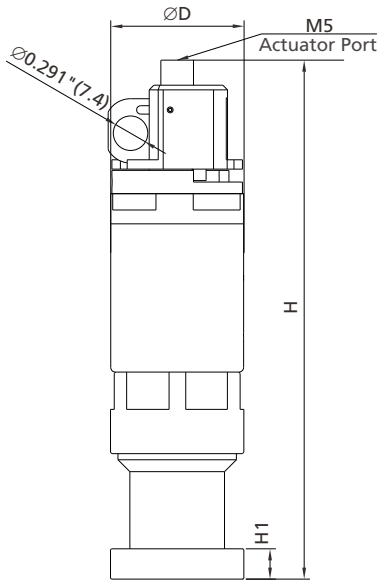
Process Specification / Item	Ultra High Purity Process (FC-03)
Material	316L SS, 316L SS VAR
Wetted Surface Roughness	Ra 5 µin. (0.13 µm)
Polishing Process	Electropolished

Dimensions and Ordering Information

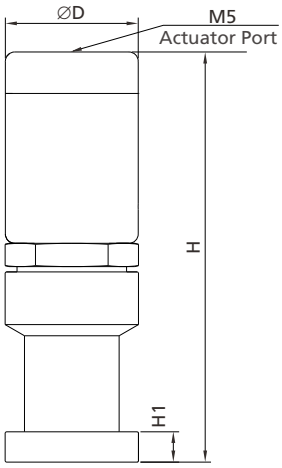
Dimensions, in inches (millimeters), are for reference only.



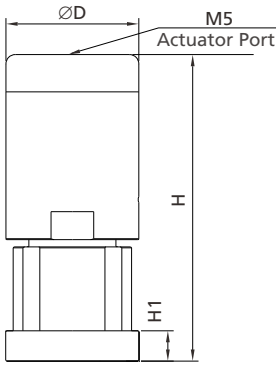
Manual with Lock



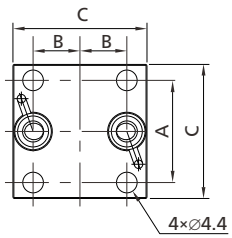
Pneumatic with Lock



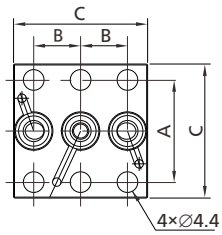
DI Pneumatic



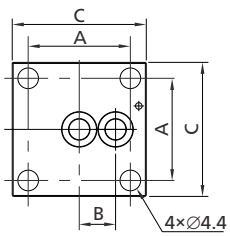
DIH Pneumatic



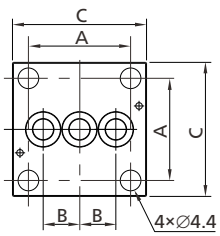
1.125"W-Seal
Bottom-2 Ports



1.125"W-Seal
Bottom-3 Ports



1.125"C-Seal
Bottom-2 Ports



1.125"C-Seal
Bottom-3 Ports

Basic Ordering Number	Port Type and Size	Dimensions, in. (mm)					
		A	B	C	D	H	H1
DI□□-WS11-CF3	1.125" W-Seal	0.86 (21.8)	0.39 (10.0)	1.13 (28.6)	1.12 (28.5)	3.41 (86.6)	0.26 (6.5)
DI□□-WS11-OF3							
DI□□-WS11-3P-CF3					1 (25.4)	3.24 (82.4)	
DI□□-WS11-3P-OF3							
DI□□-CS11-CF3	1.125" C-Seal		0.31 (7.75)		1.12 (28.5)	3.41 (86.6)	
DI□□-CS11-OF3							
DI□□-CS11-3P-CF3							
DI□□-CS11-3P-OF3							
DIH□□-WS11-UF3	1.125" W-Seal		0.39 (10.0)			3.21 (81.6)	
DIH□□-WS11-GF3						4.38 (111.3)	
DIH□□-WS11-CF3						2.91 (73.8)	
DIH□□-WS11-OF3							
DIH□□-WS11-3P-CF3					1 (25.4)	2.89 (73.4)	
DIH□□-WS11-3P-OF3							
DIH□□-CS11-UF3	1.125" C-Seal		0.31 (7.75)		1.12 (28.5)	3.21 (81.6)	
DIH□□-CS11-GF3						4.38 (111.3)	
DIH□□-CS11-CF3						2.59 (65.8)	
DIH□□-CS11-OF3							
DIH□□-CS11-3P-UF3						3.21 (81.6)	
DIH□□-CS11-3P-GF3						4.38 (111.3)	
DIH□□-CS11-3P-CF3						2.59 (65.8)	
DIH□□-CS11-3P-OF3							

Ordering Number Description

DI6LV - WS11 - 3P - CAF3

Series
DI
DIH

Body Material	
6L	316L SS
6LV	316L SS VAR

Port Type	
WS	W-Seal
CS	C-Seal

Port Size	
11	1.125"
15	1.5"

Port	
	2-Port
3P	3-Port

Actuator Type	
C	Normally Closed Pneumatic Actuator
O	Normally Open Pneumatic Actuator
U	Manual with lock
G	Pneumatic with lock

Process Specification	
F3	FC-03

Seat	
	PCTFE
A	PFA

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available; Should you have any questions, please contact FITOK Group or our authorized distributors.
2. Mounting screws and gasket are not included, please contact FITOK Group or our authorized distributors if you have any requests.