

Diaphragm Valves

DQ, DM Series



FITOK Group

FITOK GmbH (Headquarter)
Spremlinger Landstr. 115, 63069 Offenbach am Main, Germany
Tel.: +49 69 8900 4498 Fax: +49 69 8900 4495

FITOK, Inc.
13843 North Promenade Blvd., Suite 750, Stafford, Texas 77477, USA
Tel.: +1 281 888 0077 Fax: +1 281 582 4051

FITOK Incorporated
1-4F, Block C, Zone E, Yingtailong Industrial Park, Dalang Street,
Longhua District, Shenzhen, 518109, China
Tel.: +86 755 2803 2500 Fax: +86 755 2803 2619

FITOK Middle East Oil Equipment Trading LLC
208-209, Makateb Tower, Airport Road, P.O.Box 185412, Deira, Dubai, UAE
Tel.: +971 4 2959 853 Fax: +971 4 2959 854

info@fitokgroup.com
www.fitokgroup.com

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FITOK
Valves and Fittings

www.fitokgroup.com

Contents

Springless Diaphragm Valves for High Performance

DQ Series 01

All-metal Diaphragm Valves for High Performance

DM Series 14

Springless Diaphragm Valves for High Performance

DQ Series

Features

- ⦿ 316L VIM-VAR stainless steel body is available
- ⦿ Suitable for ultrahigh-purity applications
- ⦿ Elgiloy material for strength and corrosion resistance for long cycle life
- ⦿ Fully contained PCTFE seat design provides excellent resistance to swelling and contamination
- ⦿ Wetted Surface Electropolished, Roughness Ra finished to an average of Ra5 $\mu\text{in.}$ (0.13 μm)
- ⦿ Helium leak tested, maximum leak rate of 1×10^{-9} std cm^3/s
- ⦿ Low-pressure and high-pressure models
- ⦿ Manual or pneumatic actuation
- ⦿ Aluminum piston accelerated open/close speed
- ⦿ Different handle types and colors are available
- ⦿ Can be used in vacuum applications



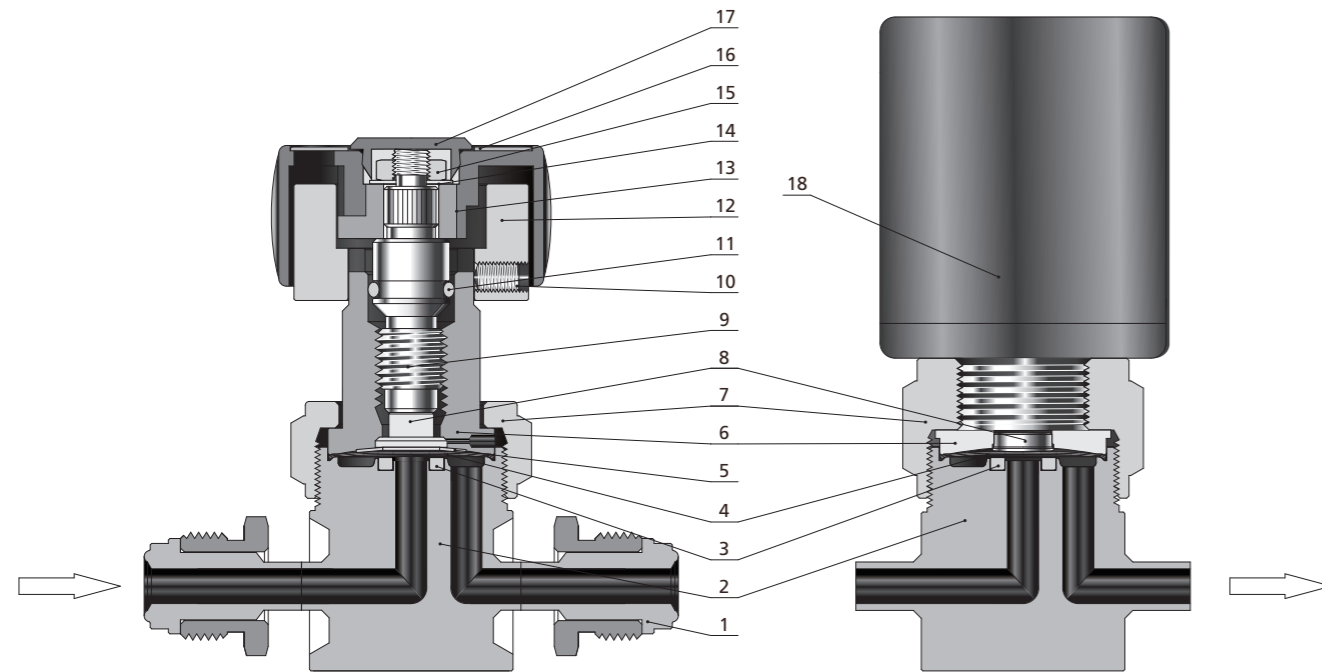
Technical Data

Sort	Max. Working Pressure psig (bar)	Working Temperature Range °F(°C)	Flow Coefficient (Cv)	Orifice in.(mm)	Pneumatic Actuator Operating Pressure psig (bar)
Low-pressure	250 (17.2)	-10 to 150 (-23 to 65)	0.27	0.16 (4.1)	60 to 120 (4.2 to 8.2)
High-pressure	3000 (207)		0.20		70 to 120 (4.9 to 8.2)

Flow Data

Pressure Drop to Atmosphere bar	Low-Pressure Models Cv=0.27		High-Pressure Models Cv=0.20	
	Air std L/min	Water L/min	Air std L/min	Water L/min
0.68	86	3.2	64	2.4
3.4	230	7.2	170	5.4
6.8	410	10.2	300	7.6

Materials of Construction



Item	Component	Material Grade/ASTM Specification	
		Low-Pressure	High-Pressure
1	Welded end connections	316 SS/A479 or 316L SS/A479 or 316L VIM-VAR SS/SEMI F20	
2	Body	316 SS/A479 or 316L SS/A479 or 316L VIM-VAR SS/SEMI F20	
3	Seat	PCTFE/D1430	
4	Diaphragm	Elgiloy/AMS 5876	Elgiloy/AMS 5876&C17200/B194
5	Washer	—	S17700/A693
6	Bonnet	S17400/A564	
7	Bonnet nut	316 SS/A479	
8	Button	316 SS/A479	
9	Stem	316 SS/A479	
10	Hexagon socket set	304 SS	
11	O-rings	NBR	
12	Actuator	316 SS/A276	
13	Manual Actuator	Round handle	ABS with stainless steel insert
		Directional handle	Nylon with stainless steel insert
		Integral lockout handle	Aluminum with anodic oxidation of surface
		Toggle handle	316 SS with epoxy coating
14	Gasket	65 Mn	
15	Nut	304 SS	
16	Lable	PVC	
17	Cap	ABS	
18	Pneumatic Actuator	Aluminum	

Product technology grade

Grade	General purpose	Special Cleaning and Packaging	Ultrahigh-purity
Material	316 SS or 316L SS or 316L VIM-VAR SS/SEMI F20		
Wetted Surface Roughness	Ra 10 µin. (0.25 µm)	Ra 5 µin. (0.13 µm)	
Process	Machine finished	Electropolished	
Process Specification	FC-01 Standard Cleaning and Packaging	FC-02 Special Cleaning and Packaging	FC-03 Ultrahigh-Purity Process Specification
Cleaning	Thrice degreasinga ultrasonic cleaning	Special cleaning with non-ozone-depleting chemicals	Ultrahigh-purity cleaning with a continuously monitored, deionized water, ultrasonic cleaning system
Assembly	At atmosphere	Performed in specially cleaned areas	Performed in ISO Class 5 work areas
Testing	Inboard helium leak tested to maximum leak rate of 1x10 ⁻⁹ std cm ³ /s		
Packing	Individually bagged	Individually bagged	Valves are double bagged and vacuum sealed in cleanroom bags

Manual Actuators

Round

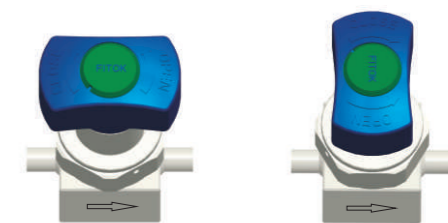
- Quick, quarter-turn actuation
- Handle with window provides visual indication of open and closed positions



OPEN CLOSED

Directional

- Quick, quarter-turn actuation
- Handle shape provides visual indication of open and closed position



OPEN CLOSED

Integral Lockout

- Quick, quarter-turn actuation
- Lockable in the CLOSED position for safety
- Handle shape and window indicator provides visual indication of OPEN and CLOSED position

Toggle

- Spring-loaded toggle design quick actuation
- Lockable in the CLOSED position for safety
- Handle position provides visual indication of OPEN and CLOSED positions
- Narrow handle profile allows close parallel mounting of valves
- Only for low-pressure models

Pneumatic Actuators

High-Pressure Pneumatic Actuator

- Normally open, "N.O." marked on the top of the cylinder
- Normally close, "N.C." marked on the top of the cylinder

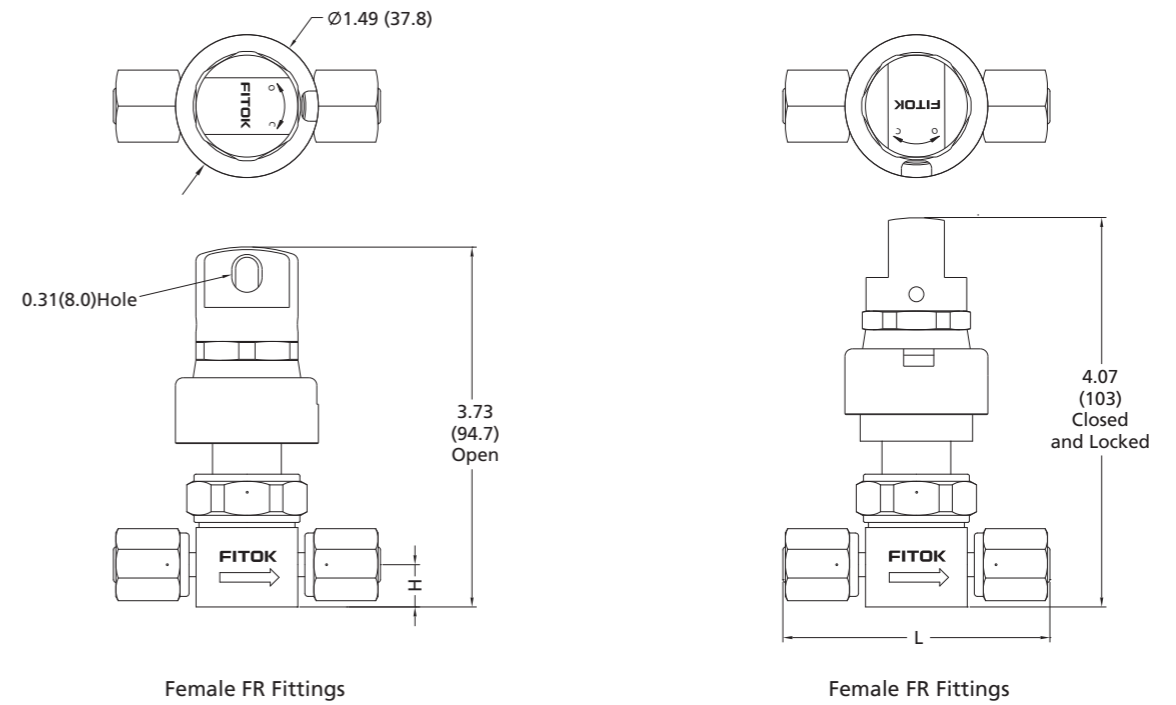


Low-Pressure Pneumatic Actuator

- Normally open, "N.O." marked on the top of the cylinder
- Normally close, "N.C." marked on the top of the cylinder



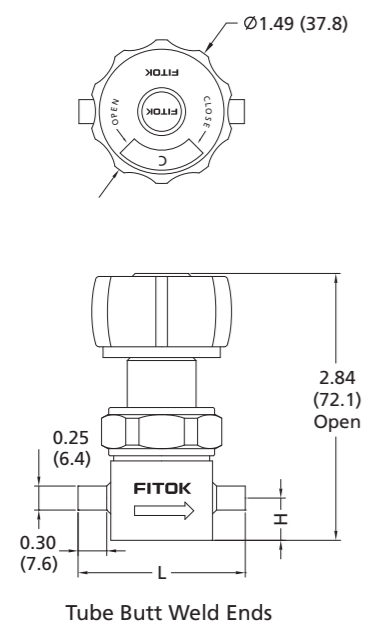
Integral Lockout Handle



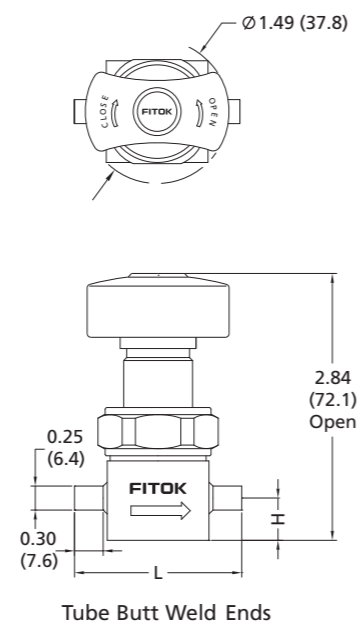
Dimensions

Low-Pressure Valves

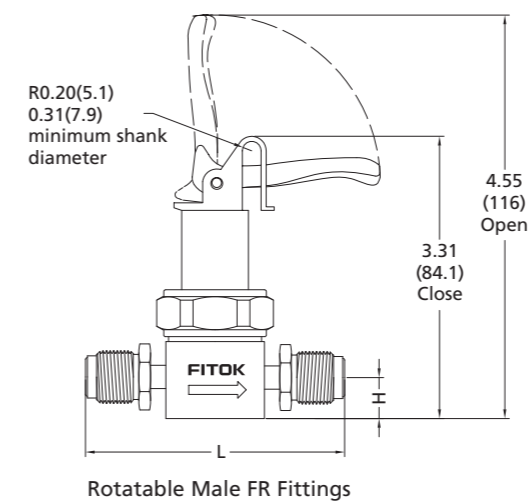
Round Handle



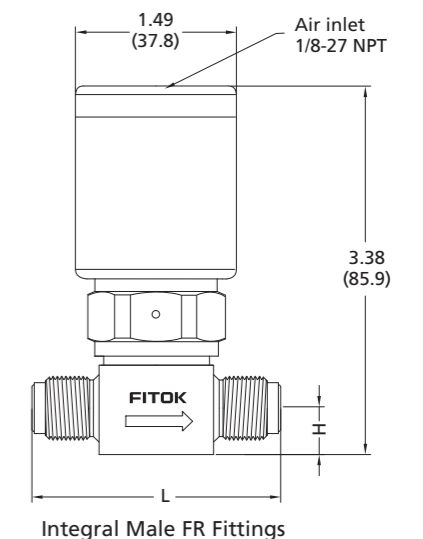
Directional Handle



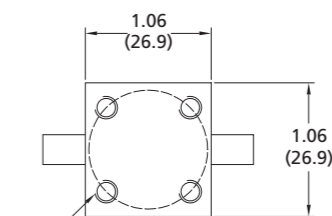
Toggle Handle



Pneumatic Actuator



Bottom

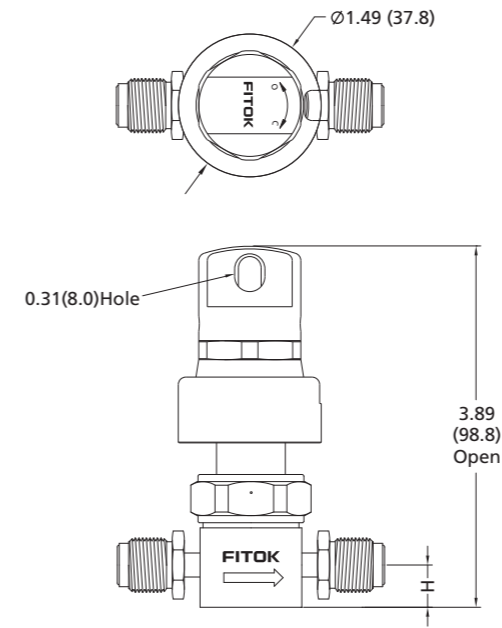


Four mounting holes, M5x0.8-6H thread, 0.25(6.4) deep, 45° from center line, on a 1.00(25.4) bolt circle. M5x0.8-6H holes are compatible with 10-32 mounting screws.

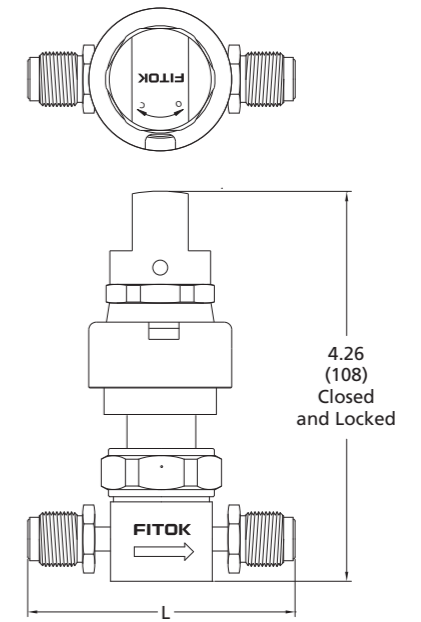
Basic Ordering Number	Connection Type and Size		Dimension, in.(mm)	
	Inlet	Outlet	L	H
DQ□□-TB4-L-	1/4" tube butt weld 0.30" (7.6 mm) tube stub, 0.035" (0.89 mm) wall	1/4" tube butt weld 0.30" (7.6 mm) tube stub, 0.035" (0.89 mm) wall	1.74 (44.2)	0.44 (11.2)
DQ□□-TB4S-L-	1/4" tube butt weld 0.26" (6.6 mm) tube stub, 0.035" (0.89 mm) wall	1/4" tube butt weld 0.26" (6.6 mm) tube stub, 0.035" (0.89 mm) wall	1.61 (40.9)	0.44 (11.2)
DQ□□-MTB6-L-	6 mm tube butt weld, 1 mm wall	6 mm tube butt weld 1 mm, wall	1.74 (44.2)	0.44 (11.2)
DQ□□-FFR4-L-	1/4" female FR fitting	1/4" female FR fitting	2.78 (70.6)	0.44 (11.2)
DQ□□-RFR4-L-	1/4" rotatable male FR fitting	1/4" rotatable male FR fitting		
DQ□□-FR4-L-	1/4" integral male FR fitting	1/4" integral male FR fitting	2.30 (58.4)	0.44 (11.2)
DQ□□-FL4-L-	1/4" FITOK tube fittings	1/4" FITOK tube fittings	2.46 (62.5)	0.44 (11.2)
DQ□□-ML6-L-	6 mm FITOK tube fittings	6 mm FITOK tube fittings	2.45 (62.2)	0.44 (11.2)

High-Pressure Valves

Integral Lockout Handle

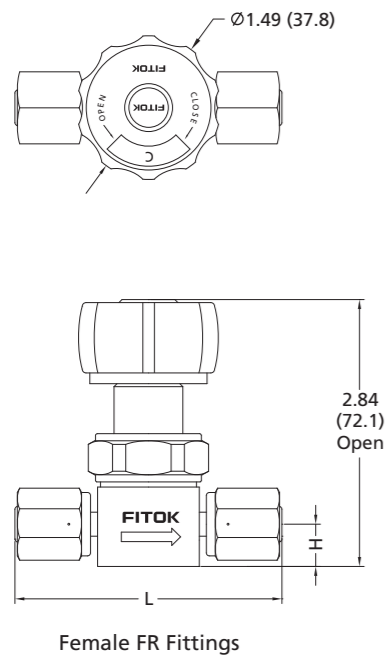


Rotatable Male FR Fittings



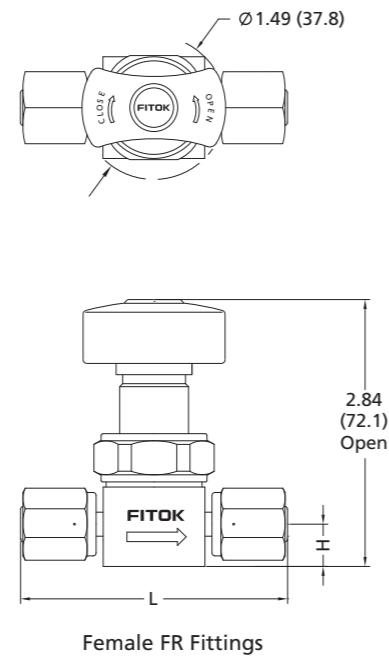
Rotatable Male FR Fittings

Round Handle



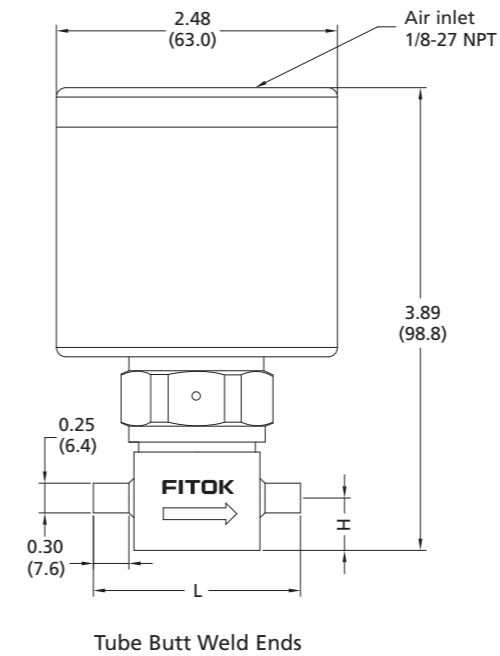
Female FR Fittings

Directional Handle



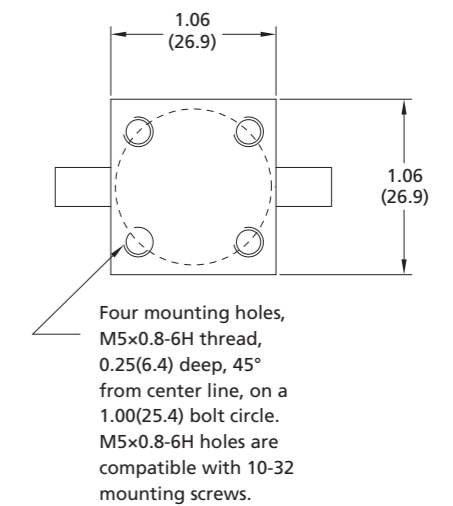
Female FR Fittings

Pneumatic Actuator



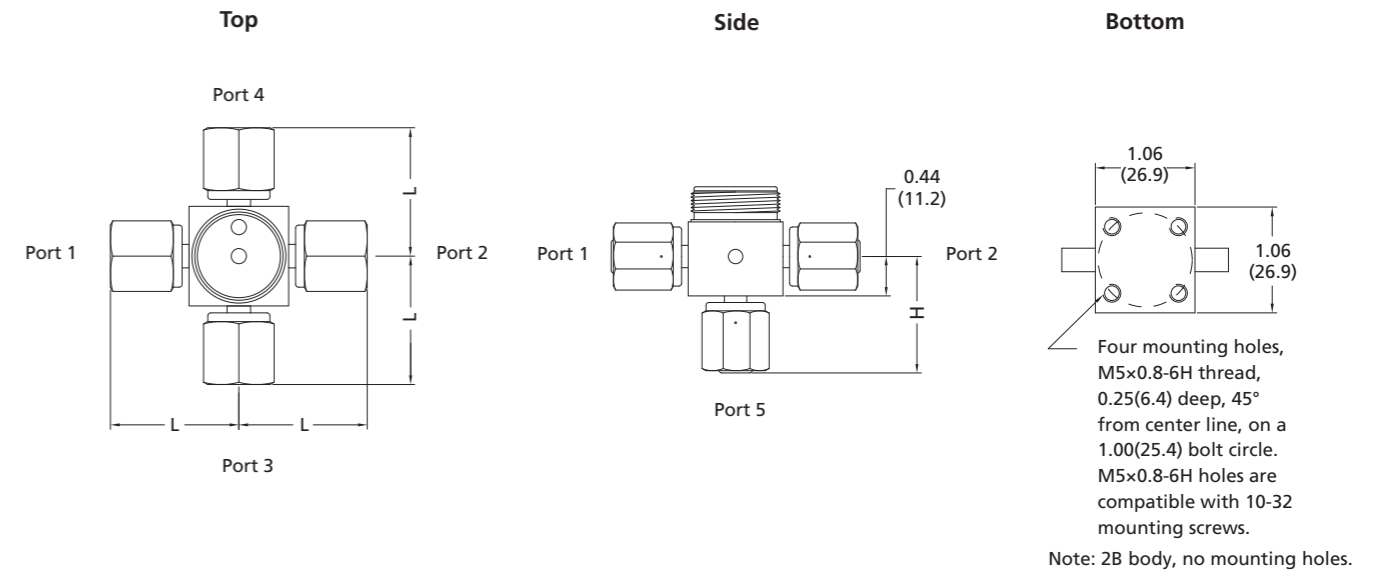
Tube Butt Weld Ends

Bottom



Basic Ordering Number	Connection Type and Size		Dimension, in. (mm)	
	Inlet	Outlet	L	H
DQ□□-TB4-H-	1/4" tube butt weld 0.30" (7.6 mm) tube stub, 0.035" (0.89 mm) wall	1/4" tube butt weld 0.30" (7.6 mm) tube stub, 0.035" (0.89 mm) wall	1.74 (44.2)	0.44 (11.2)
DQ□□-TB4S-H-	1/4" tube butt weld 0.26" (6.6 mm) tube stub, 0.035" (0.89 mm) wall	1/4" tube butt weld 0.26" (6.6 mm) tube stub, 0.035" (0.89 mm) wall	1.61 (40.9)	0.44 (11.2)
DQ□□-MTB6-H-	6 mm tube butt weld, 1 mm wall	6 mm tube butt weld 1 mm, wall	1.74 (44.2)	0.44 (11.2)
DQ□□-FFR4-H-	1/4" female FR fitting	1/4" female FR fitting	2.78 (70.6)	0.44 (11.2)
DQ□□-RFR4-H-	1/4" rotatable male FR fitting	1/4" rotatable male FR fitting		
DQ□□-FR4-H-	1/4" integral male FR fitting	1/4" integral male FR fitting	2.30 (58.4)	0.44 (11.2)
DQ□□-FL4-H-	1/4" FITOK tube fittings	1/4" FITOK tube fittings	2.46 (62.5)	0.44 (11.2)
DQ□□-ML6-H-	6 mm FITOK tube fittings	6 mm FITOK tube fittings	2.45 (62.2)	0.44 (11.2)

End Connections and Dimentions



Multiport and Elbow Valves

- Select a flow path as viewed from the top of the valve
- An a next to the port number indicates inlet of the valve
- A b next to the port number indicates outlet of the valve

Designator	Schematic	Flow Path		Designator	Schematic	Flow Path	
		Closed	Open			Closed	Open
2A				3D			
2B				3E			
2C				3F			
4M				3G			
4N				3K			

Designator	End Connection	Dimentions, in. (mm)	
		L	H
TB4	1/4" tube butt weld 0.30" (7.6 mm) tube stub, 0.035" (0.89 mm) wall	0.87 (22.1)	0.76 (19.3)
TB4S	1/4" tube butt weld 0.26" (6.6 mm) tube stub, 0.035" (0.89 mm) wall	0.81 (20.6)	0.70 (17.8)
MTB6	6mm tube butt weld, 1 mm wall	0.87 (22.1)	0.76 (19.3)
FFR4	1/4" female FR fitting	1.39 (35.3)	1.28 (32.5)
RFR4	1/4" rotatable male FR fitting	1.39 (35.3)	1.63 (41.4)

Multivalve Manifolds

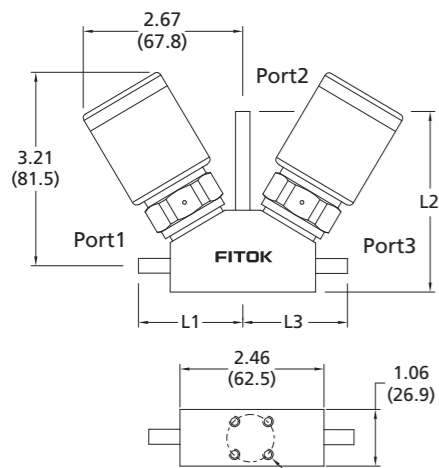
Designator	Schematic	Flow Path
V		
W		
D		

Designator	End Connection	Dimensions, in. (mm)					
		V and W Multivalve Manifolds			D Multivalve Manifold		
		L1	L2		L3	L1	
		Low-pressure	High-pressure				
TB4	1/4" tube butt weld 0.30" (7.6 mm) tube stub, 0.035" (0.89 mm) wall		1.81 (46.0)	2.79 (70.9)	4.04 (103)	1.81 (46.0)	0.87 (22.1)
FFR4	1/4" female FR fitting		2.03 (51.6)	2.66 (67.6)	3.91 (99.3)	2.03 (51.6)	1.39 (35.3)
RFR4	1/4" rotatable male FR fitting		2.39 (60.7)	3.35 (85.1)	4.60 (117)	2.39 (60.7)	

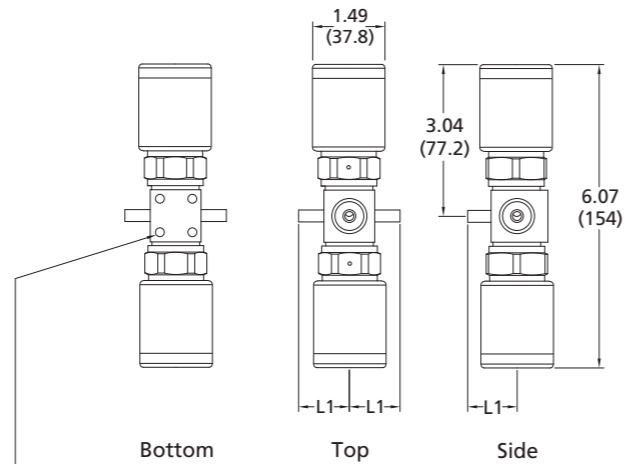
IGS Modular Surface-Mount Valves

End Connections and Dimensions

V and W Multivalve Manifolds

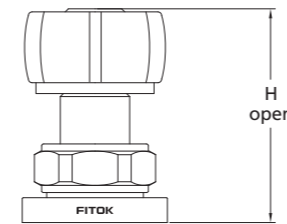


D Multivalve Manifold

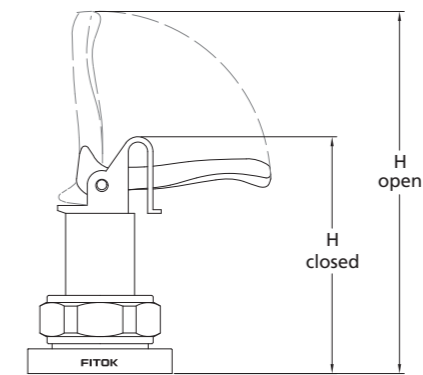


Four bottom mounting holes, M5x0.8-6H thread, 0.25 (6.4) deep, located 45° from center line, on a 1.00 (25.4) bolt circle. M5x0.8-6H holes are compatible with 10-32 mounting screws.

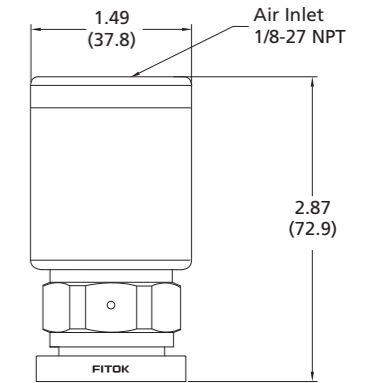
Directional and Round Handles



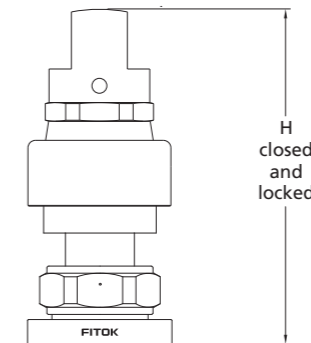
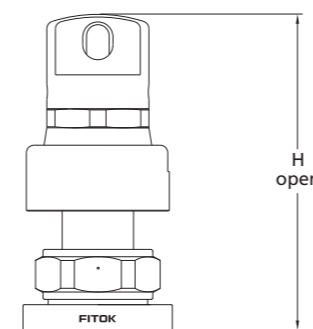
Toggle Handle



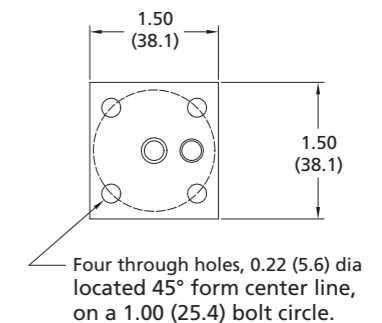
Pneumatic Actuator



Integral Lockout Handle



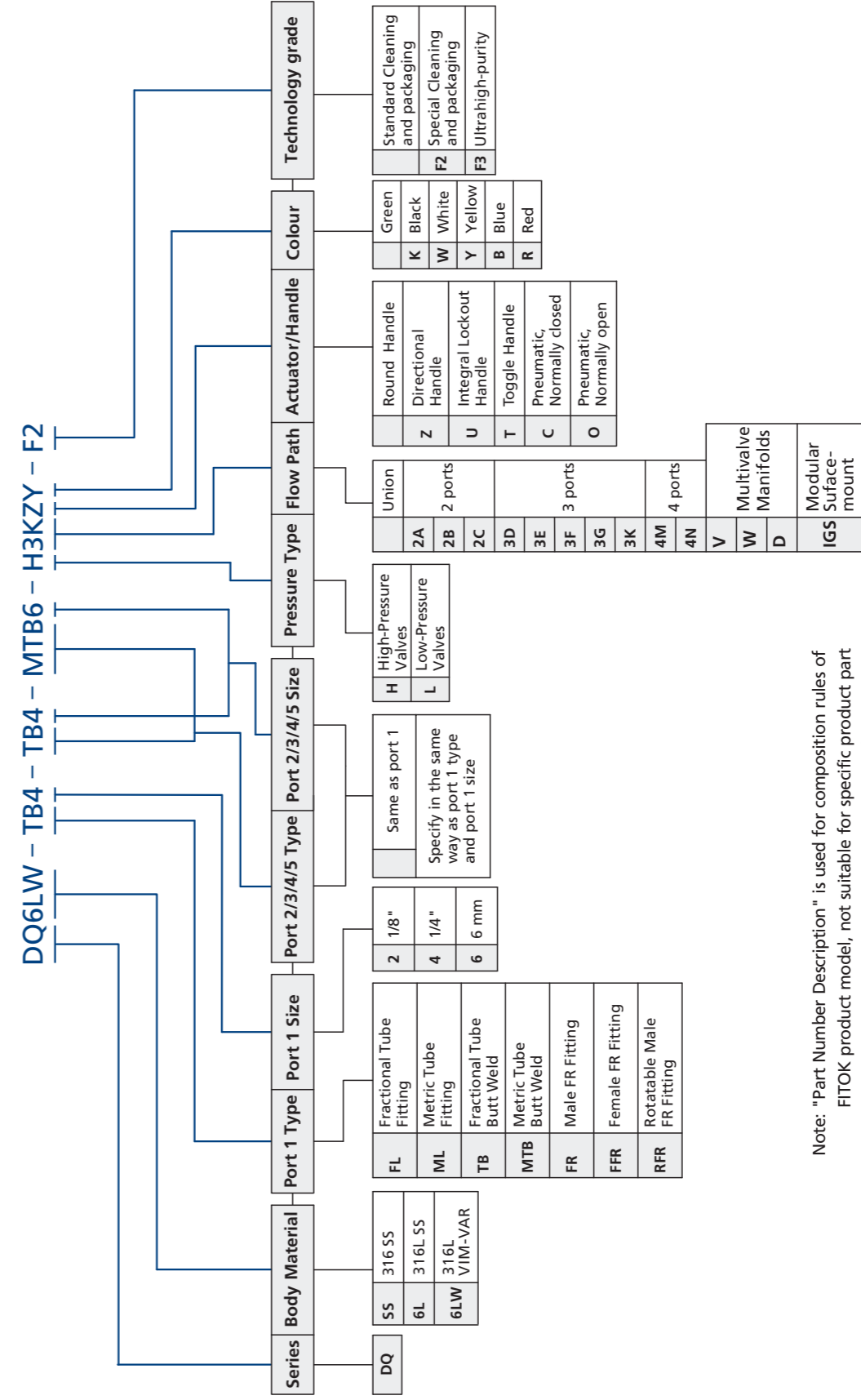
Bottom



Handle Type	Dimensions, in.(mm)			
	Low-Pressure		High-Pressure	
	H Open	H Closed	H Open	H Closed
Directional and Roud	2.36(59.9)	2.34(59.4)	2.36(59.9)	2.34(59.4)
Integral Lockout	3.25(82.6)	3.59(91.2)	3.41(86.6)	3.78(96.0)
Toggle	2.83(71.9)	4.04(103)		

⦿ Notice: Toggle Handle and Pneumatic Actuator are not used for high pressure system.

Part Number Description



Note: "Part Number Description" is used for composition rules of FITOK product model, not suitable for specific product part number selection, not random combinations. If in doubt, please contact FITOK group or authorized agent.

All-metal Diaphragm Valves for High Performance

DM Series

Features

- All-metal containment, packless
- Repetitive shutoff with fully contained softseat stem tip
- Position indicator ring for lever handle
- Manual or pneumatic actuation
- Aluminum piston accelerated open/close speed
- Helium leak tested, maximum leak rate of 4×10^{-9} std cm^3/s
- Different handle types and colors are available
- Can be used in vacuum applications



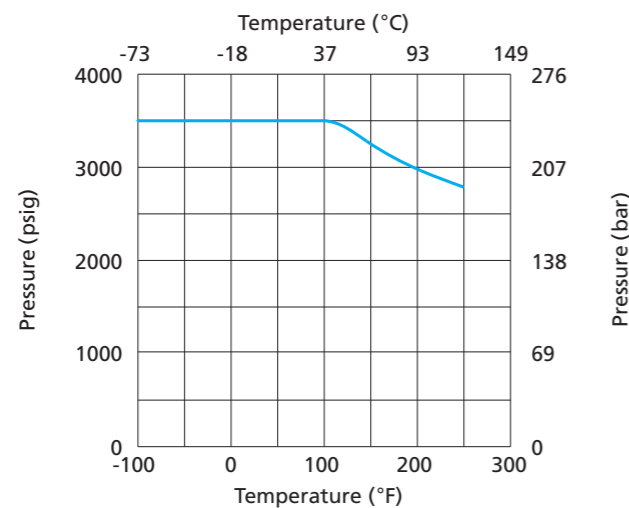
Technical Data

Sort	Max. Working Pressure psig (bar)	Working Temperature Range °C (°F)	Flow Coefficient (Cv)	Orifice in. (mm)	Operating/Operating Pressure psig (bar)
Lever handle	3500 (241)	-73 to 121 (-100 to 250)	0.14	0.156 (4.0)	Approximately one quarter turn to operate from fully open to closed
Round handle			0.30		Approximately one and one-half turns to operate from fully open to closed
Pneumatic actuator			0.20		70 to 120 (4.9 to 8.2)

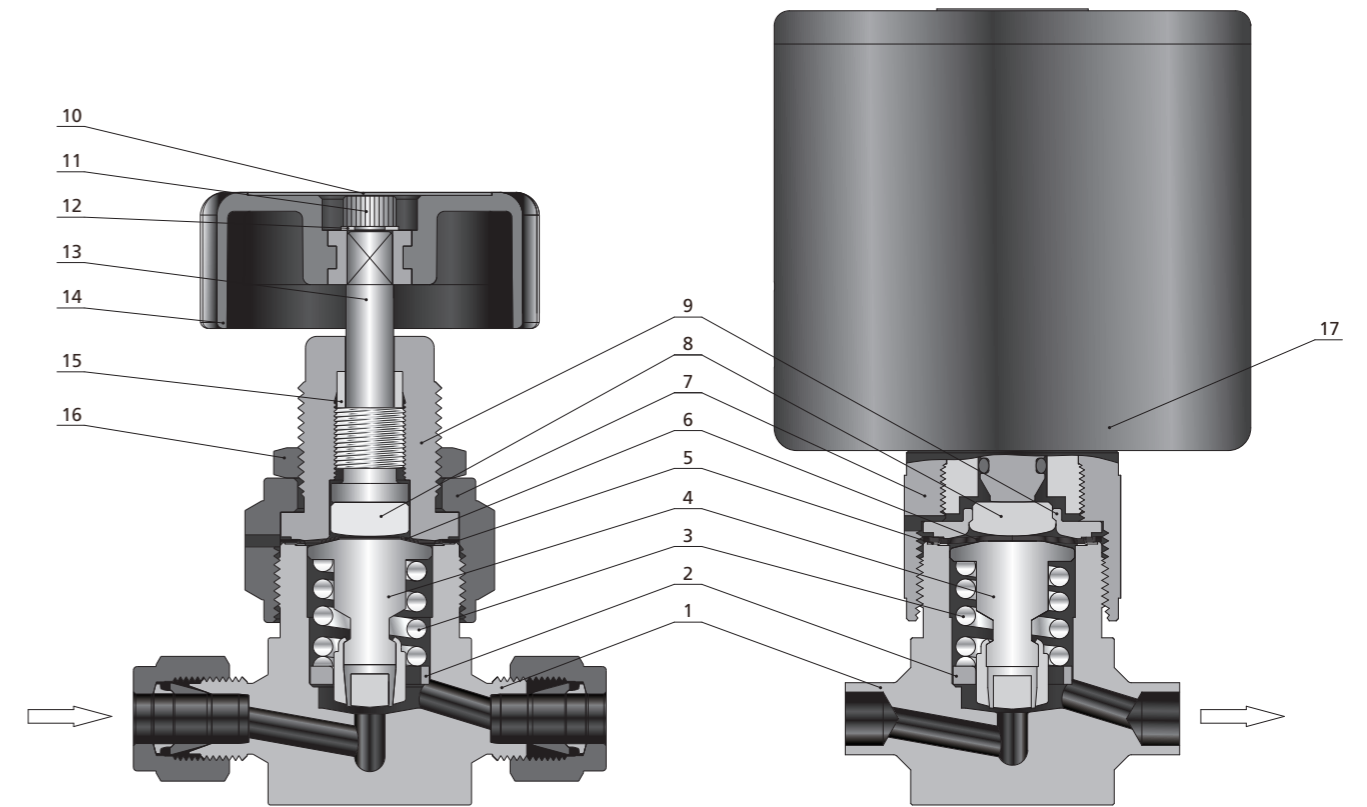
Flow Data

Pressure Drop to Atmosphere ΔP (bar)	Lever handle Cv=0.14		Round handle Cv=0.30		Pneumatic actuator Cv=0.20	
	Air std L/min	Water L/min	Air std L/min	Water L/min	Air std L/min	Water L/min
0.68	49	1.6	100	3.5	64	2.4
3.4	130	3.9	270	8.0	170	5.4
6.8	240	5.4	490	11.4	300	7.6

Pressure-Temperature Ratings



Materials of Construction



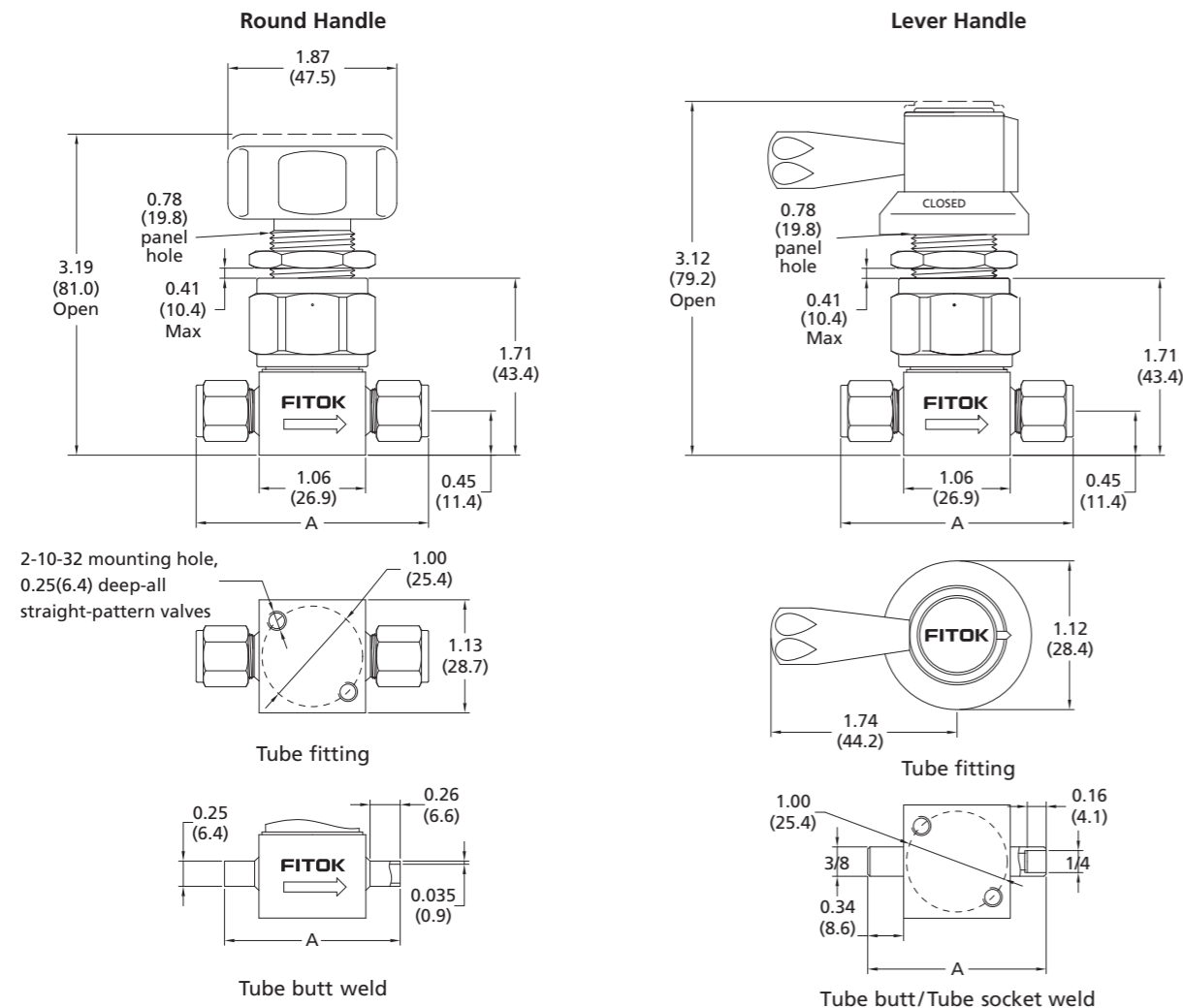
Item	Component	Material Grade/ASTM Specification	
		Manual	Pneumatic Actuation
1	Body	316 SS/A479/316L SS/A479	
2	Guide	Electropolished 316 SS/A479	
3	Spring	316 SS/A313	
4	Stem assembly	Stem plug	316L SS/A479
		Stem insert	PCTFE/D1430
		Stem container	316L SS/A479
		Stem	316L SS/A479
5	Gasket	PTFE-coated 316L SS/A240	
6	Diaphragms	Elgiloy/AMS 5876	Elgiloy/AMS 5876 & C17200/B194
7	Bonnet nut	316 SS/A479	
8	Actuator Button	C36000/B16	
9	Bonnet	316 SS/A479	S17400/A564
10	Lable	PVC	---
11	Set Screw	304 SS	---
12	Gasket	65Mn	---
13	Actuator	416SS/A582	---
14	Round Handle	ABS	---
15	Wipe Ring	PTFE	---
16	Panel mount nut	316 SS/A479	---
17	Pneumatic Actuator	---	Aluminum 6061/B211

Product technology grade

Grade	General purpose	Special Cleaning and Packaging	Ultrahigh-purity
Material	316 SS or 316L SS		
Wetted Surface Roughness	Ra 25 µin. (0.64 µm)	Ra 10 µin. (0.25 µm)	
Process	Machine finished	Electropolished	
Process Specification	FC-01 Standard Cleaning and Packaging	FC-02 Special Cleaning and Packaging	FC-03 Ultrahigh-Purity Process Specification
Cleaning	Thrice degreasing ultrasonic cleaning	Special cleaning with non-ozone-depleting chemicals	Ultrahigh-purity cleaning with a continuously monitored, deionized water, ultrasonic cleaning system
Assembly	At atmosphere	Performed in specially cleaned areas	Performed in ISO Class 5 work areas
Testing	Inboard helium leak tested to maximum leak rate of 4x10 ⁻⁹ std cm ³ /s		
Packing	Individually bagged	Individually bagged	Valves are double bagged and vacuum sealed in cleanroom bags

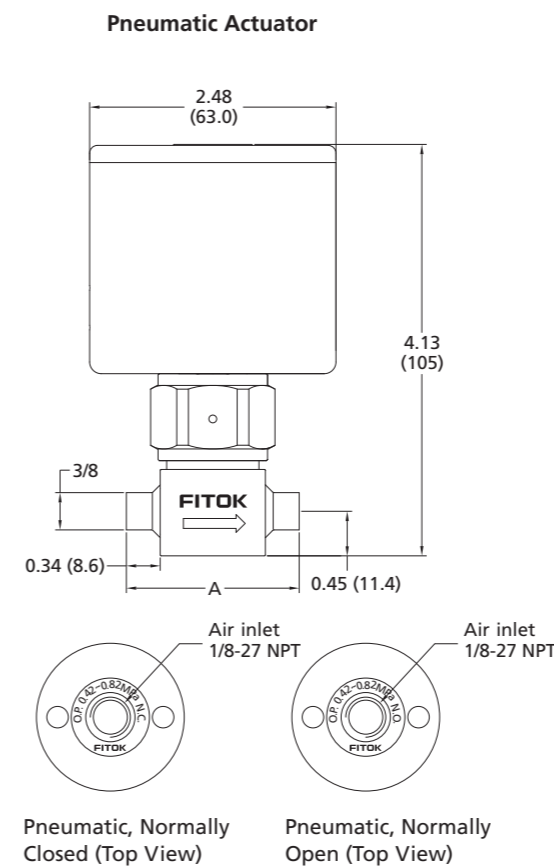
Dimensions

Straight Patterns

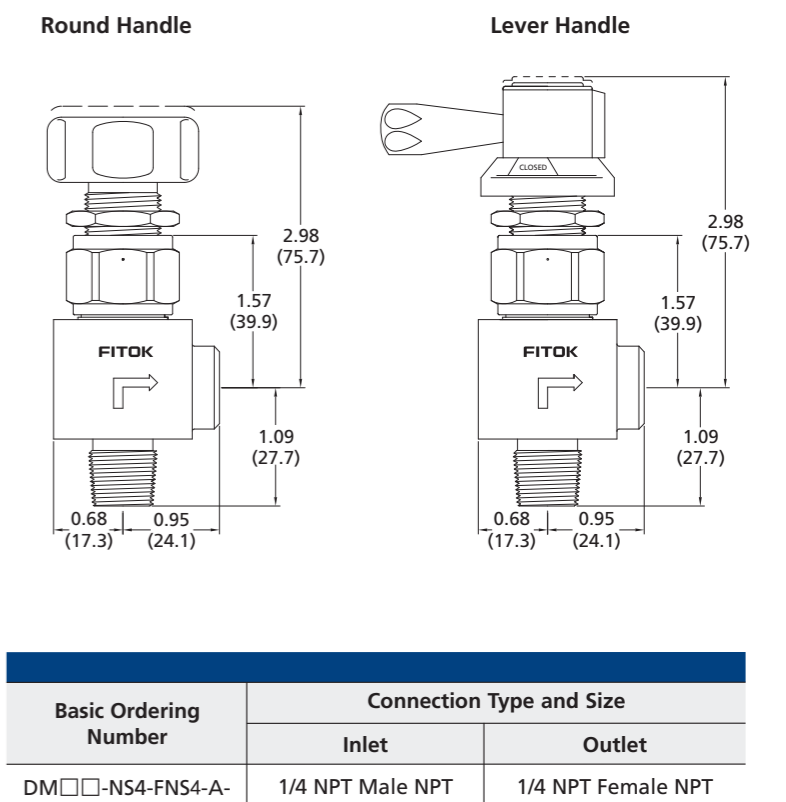


Basic Ordering Number	Connection Type and Size		Dimension, in. (mm)
	Inlet	Outlet	A
DM□□-FL4-	1/4" FITOK tube fittings	1/4" FITOK tube fittings	2.46 (62.5)
DM□□-FL6-	3/8" FITOK tube fittings	3/8" FITOK tube fittings	2.58 (65.5)
DM□□-ML6-	6 mm FITOK tube fittings	6 mm FITOK tube fittings	2.46 (62.5)
DM□□-ML8-	8 mm FITOK tube fittings	8 mm FITOK tube fittings	2.53 (64.3)
DM□□-TB4-	1/4" Tube butt weld	1/4" Tube butt weld	1.74 (44.2)
DM□□-TB6-	3/8" Tube butt weld	3/8" Tube butt weld	1.74 (44.2)
DM□□-TB6-TS4-	3/8" Tube butt weld	1/4" Tube socket weld	1.75 (44.4)
DM□□-TB8-TS6-	1/2" Tube butt weld	3/8" Tube socket weld	1.81 (46.0)
DM□□-NS4-	1/4" Male NPT	1/4" Male NPT	2.46 (62.5)
DM□□-FNS4-	1/4" Female NPT	1/4" Female NPT	2.46 (62.5)
DM□□-FR4-	1/4" Male FR fitting	1/4" Male FR fitting	2.30 (58.4)
DM□□-FFR4-	1/4" Female FR fitting	1/4" Female FR fitting	2.76 (70.1)
DM□□-FFR4-FR4-	1/4" Female FR fitting	1/4" Male FR fitting	2.54 (64.5)
DM□□-FR4-FFR4-	1/4" Male FR fitting	1/4" Female FR fitting	2.54 (64.5)
DM□□-FO4-	1/4" Male FO fitting	1/4" Male FO fitting	2.00 (50.8)

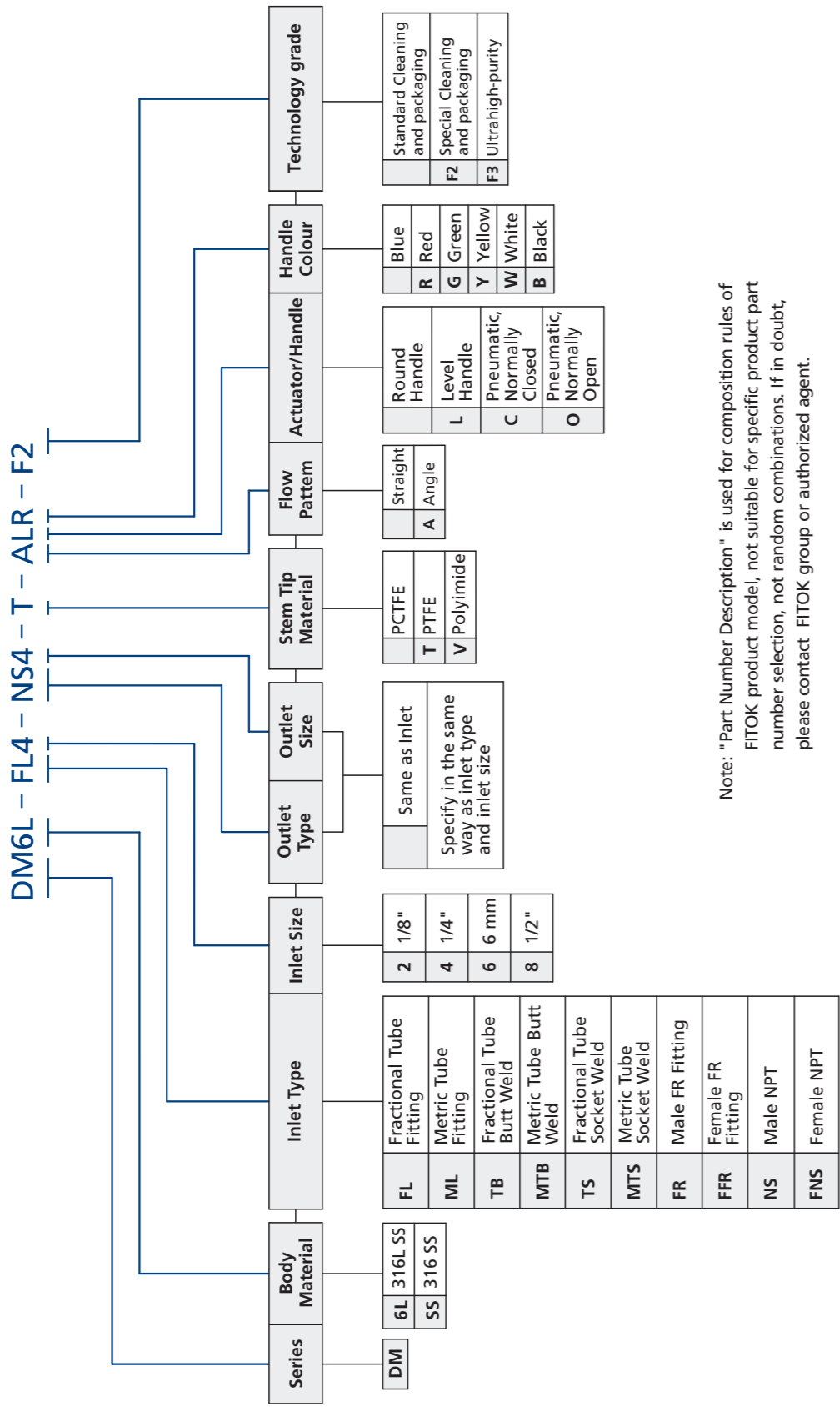
Straight Patterns



Angle Patterns



Basic Ordering Number	Connection Type and Size	
	Inlet	Outlet
DM□□-NS4-FNS4-A-	1/4 NPT Male NPT	1/4 NPT Female NPT



Note: "Part Number Description" is used for composition rules of FITOK product model, not suitable for specific product part number selection, not random combinations. If in doubt, please contact FITOK group or authorized agent.