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, 0.5
Orifice Size		0.16 in. (4.1 mm), 0.20 in. (5.1 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)

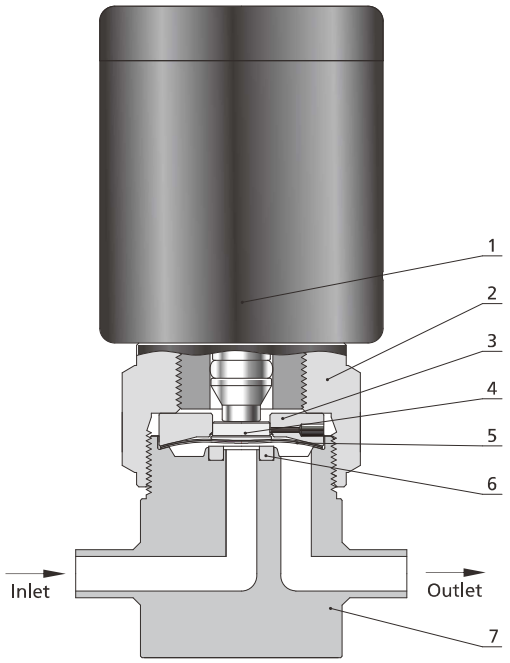
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	86	3.2
50 (3.4)	230	7.2
100 (6.8)	410	10.2

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

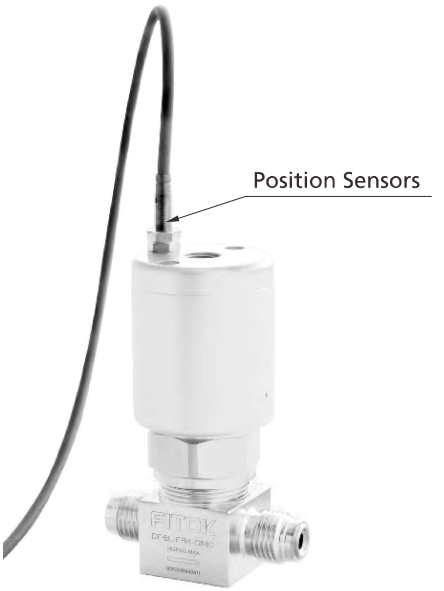


Normally Closed Pneumatic Model

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

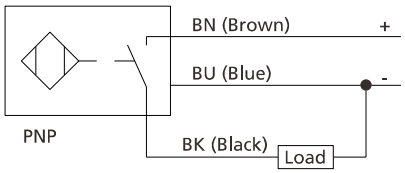
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

Technical Information

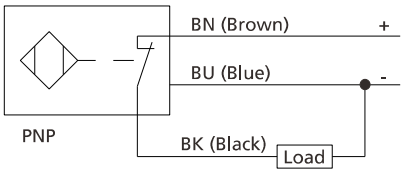
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

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

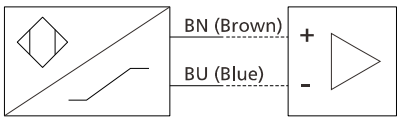
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

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

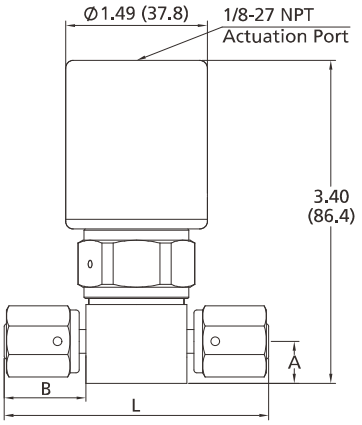


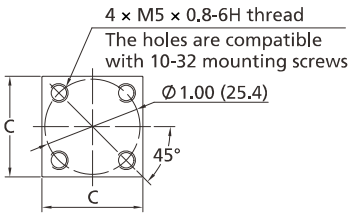
Dimensions and Ordering Information

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		0.26 (6.6)		
DP□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting		0.86 (21.8)		2.78 (70.6)
DP□□-RFR4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting				
DP□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting		0.62 (15.7)		2.30 (58.4)

Ordering Number Description

DP6L – TB4 – FR4 – – CAF2MOV – CE

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

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	

Seat	
	PCTFE
A	PFA

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

Accessory	
	None
V	Solenoid Valve Assembly

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

CV	
	0.27
CV5	0.5

Actuator Type	
C	Normally Closed Pneumatic
O	Normally Open Pneumatic

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

Product Certification ①	
	None
CE	CE Certification
AX	ATEX Certification

① The solenoid valve assembly is not available with CE or ATEX certifications. When selecting a solenoid valve assembly as an option, the part number must not include "CE" or "AX".

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 ATEX 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