DKD Series Diaphragm Valves

Product Data Sheet

< STANDARDS >

ASTM D1784
ASTM D1785
ASTM D2466
ASTM D2467
ASTM D2464
ASTM F1498

ANSI B1.20.1
ANSI B16.5

IPEX DKD Series Diaphragm Valves are ultra-compact, direct acting pneumatic valves. The DKD diaphragm valve is suitable for shutting off very dirty and highly viscous fluids. The internal geometry of the body optimizes fluid dynamic efficiency by increasing the flow rate. The valve is comprised of three elements: the body, diaphragm and sealing bonnet. When compressed air enters the bonnet, the diaphragm is pressed against the body's weir, interrupting the flow. This simplified operating principle and the lower number of components guarantees high reliability and durability. The DKD Series Diaphragm Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance and dimensional standards.

VALVE AVAILABILITY

Body Material	PVC
Size Range	1/2" through 2"
Pressure	120 psi
Diaphragm	EPDM
Control Style	Direct Acting Pneumatic
End Connections	Spigot, True Union

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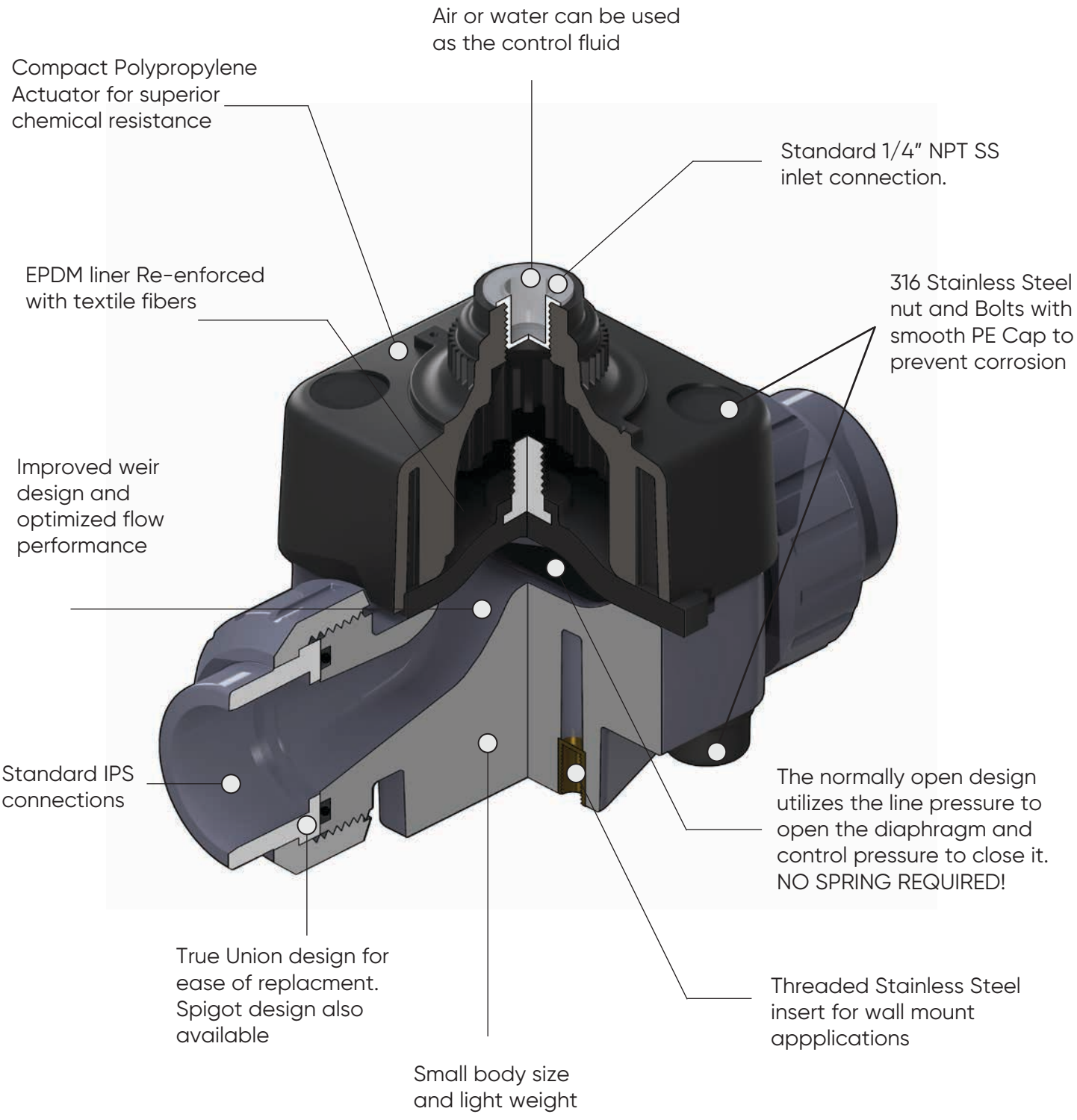
DKD Series Diaphragm Valves

Product Data Sheet

Features & Benefits



DKD Series Diaphragm Valves

Product Data Sheet

Valve Selection

Significant Number	IPEX Part Number	Body Material	Body Style	Liner Material	Size	Control Style	Pressure Rating @ 73oF
DKUV103D	354255	PVC	True Union	EPDM	1/2″	Direct Acting Pneumatic	120 PSI
DKUV104D	354263				3/4″		
DKUV105D	354264				1″		
DKUV106D	354272				1 1/4″		
DKUV107D	354273				1 1/2″		
DKUV108D	354299				2″		
DKYV103D	354183	PVC	Spigot	EPDM	1/2″	Direct Acting Pneumatic	120 PSI
DKYV104D	354191				3/4″		
DKYV105D	354182				1″		
DKYV106D	354200				1 1/4″		
DKYV107D	354201				1 1/2″		
DKYV108D	354227				2″		

Significant Number

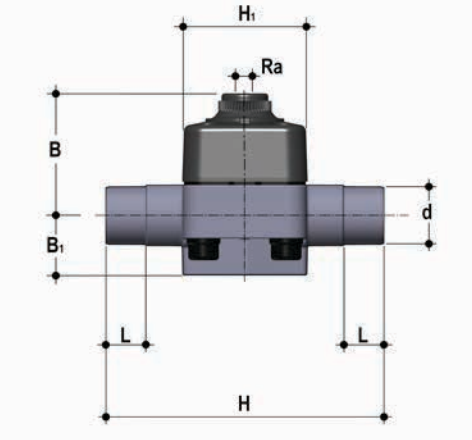
Code	DK	Y	V	1	05	D	
Position	1	2	3	4	5	6	7

Position	Code	Description
1		Model
	DK	Diaphragm Valve
2		Connection
	U	True Union
	Y	IPS Sigot
3		Body Material
	V	PVC
4		Liner Material
	1	EPDM
5	Size	Imperial / DN
	03	1/2″ / 15 mm
	04	3/4″ / 20 mm
	05	1″ / 25 mm
	06	1-1/4″ / 32 mm
	07	1-1/2″ / 40 mm
	08	2″ / 50 mm
6		Disc Material
	D	Direct Acting Pneumatic
7		Control Style
	S	Silicone Free
		Not Applicable (Leave Blank)

DKD Series Diaphragm Valves

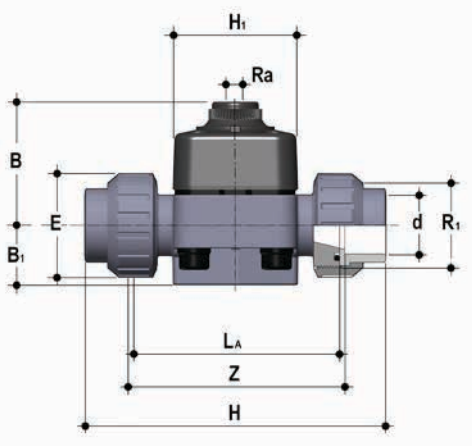
Product Data Sheet

Dimensions



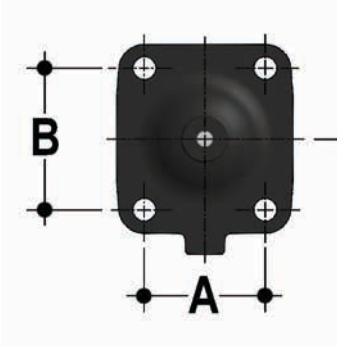
Spigot Valve – Dimension (inches)

d	DN	B	B_1	H	H_1	L	R_a	Weight (lbs)
1/2″	15	2.28	0.98	5.46	2.56	0.93	1/4″	0.68
3/4″	20	2.40	1.16	6.06	2.56	1.01	1/4″	0.82
1″	25	2.76	1.30	6.06	2.76	1.15	1/4″	1.32
1-1/4″	32	2.83	1.18	7.52	2.76	13.58	1/4″	1.60
1-1/2″	40	3.43	1.38	7.68	3.90	1.42	1/4″	2.89
2″	50	4.29	1.81	8.86	4.49	1.54	1/4″	5.10



True Union Valve – Dimension (inches)

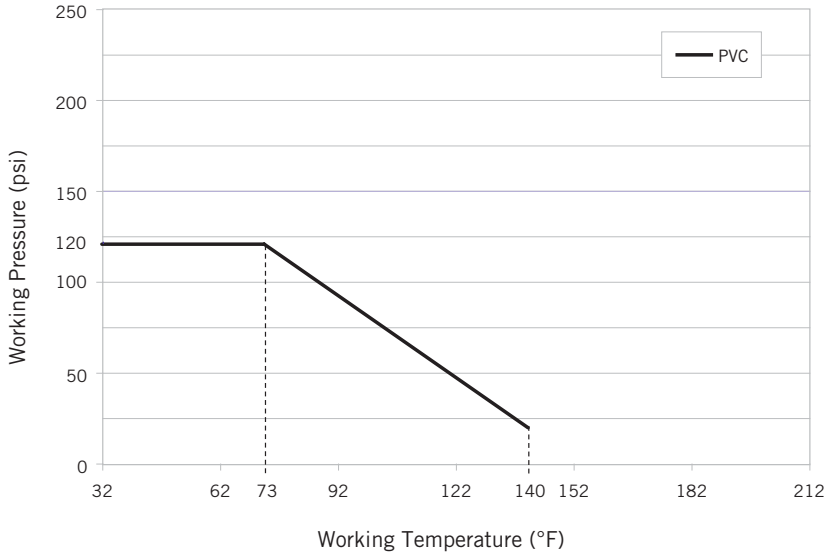
d	B	B_1	E	H	H_1	La	R_1	Z	Ra	Weight (lbs)
1/2″	2.28	0.98	1.61	5.63	2.56	3.54	1″	3.86	1/4″	0.86
3/4″	2.40	1.18	1.97	6.57	2.56	4.25	1 1/4″	4.53	1/4″	0.99
1″	2.76	1.30	2.28	7.09	2.76	4.57	1 1/2″	4.80	1/4″	2.68
1-1/4″	2.83	1.18	2.83	8.19	2.76	5.28	2″	5.67	1/4″	2.68
1-1/2″	3.43	1.38	3.11	9.21	3.90	6.06	2 1/2″	6.46	1/4″	2.68
2″	4.29	1.81	3.86	10.71	4.49	7.24	2 3/4″	7.68	1/4″	2.97

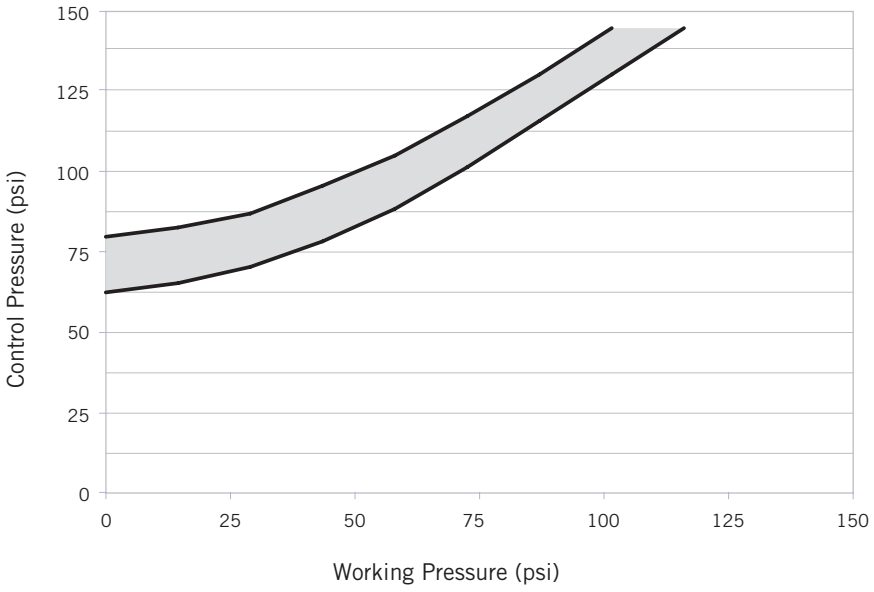


EPDM Dimensions – Dimension (inches)

DN	1/2″	3/4″	1″	1 1/4″	1 1/2″	2″
Spigot	1.57	1.57	1.81	1.81	2.56	3.07
B	1.73	1.73	2.13	2.13	2.76	3.23

Pressure – Temperature Ratings





NOTES:

- The maximum working pressure is 120 psi for all sizes.
- The maximum control pressure allowed for all sizes is 145 psi.
- The control fluid temperature should not exceed 125°F.

DKD Series Diaphragm Valves

Product Data Sheet

Flow Coefficients

The flow coefficient (C_V) represents the flow rate in gallons per minute (GPM) at 68°F for which there is a 1 psi pressure drop across the valve in the fully open position. These values are determined from an industry standard testing procedure which uses water as the flowing media (specific gravity of 1.0). To determine specific flow rate and pressure loss scenarios, one can use the following formula:

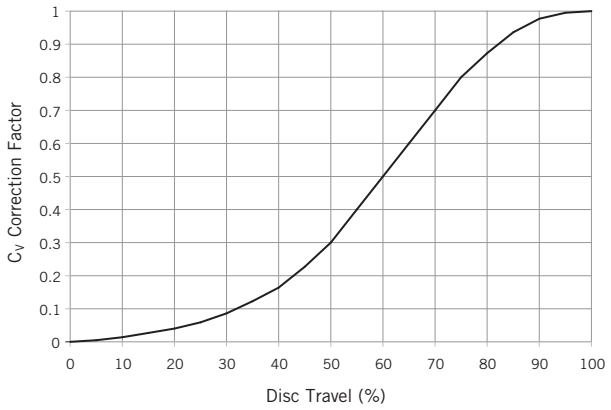
$$f = sg \times \left(\frac{Q}{C_V}\right)^2$$

Where,

- **f** is the pressure drop (friction loss) in psi,
- **sg** is the specific gravity of the fluid,
- **Q** is the flow rate in GPM,
- **C_V** is the flow coefficient.

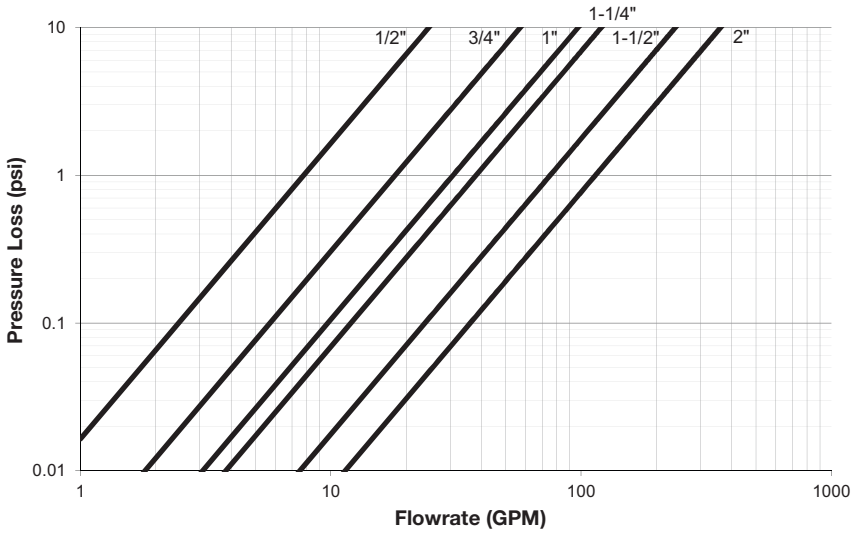
Flow Coefficient Correction Factor

Use this chart to determine the appropriate flow coefficient correction factor depending on the amount of disc travel. As the valve cycles from fully open (100% travel) to fully closed (0% travel), the corresponding C_V value will decrease in accordance with the adjacent graph.



Size (in)	C_V
1/2	7.8
3/4	18.1
1	30.8
1-1/4	38.1
1-1/2	75.3
2	114.2

Pressure Loss Chart



DKD Series Diaphragm Valves

Product Data Sheet

Actuator Information

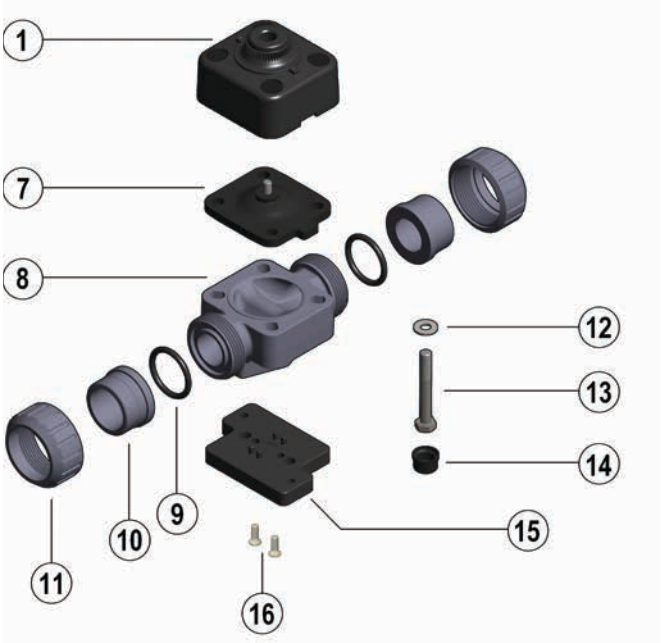
Pneumatic Actuator – Technical Specifications

Construction	Direct action pneumatic actuator (NO)
Actuator Material	Bonnet: PP-GR
Control Fluid Pressure	Minimum: 8 – 22 psi Maximum: 145 psi
Power Supply	Media: Air or Water Clean fluid, free from mineral based lubricants, which are aggressive on EPDM rubber. If using other fluids, contact the IPEX
Control Fluid Temperature	Max 120 °F
Working Fluid Temperature	-4 °F to 120 °F
Accessories	Pilot solenoid valves 3/2 ways for direct or manifold mounting

Actuator Capacity

d	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Normal Litre	0.13	0.13	0.28	0.28	0.5	0.5
Standard Cubic inch	7.93	7.93	17.09	17.09	30.51	30.51

Components



#	Component	Material	Qty
1	Sealing bonnet	PP-GR	1
7	Diaphragm	EPDM	1
8	Valve body	PVC-U	1
9	Socket seal O-ring	EPDM	2
10	End connector	PVC-U	2
11	Union nut	PVC-U	2
12	Washer	Stainless Steel	4
13	Bolt	Stainless Steel	4
14	Protection plug	PE	4
15	Distance plate	PP-GR	1
16	Screws	Stainless Steel	2

DKD Series Diaphragm Valves

Product Data Sheet

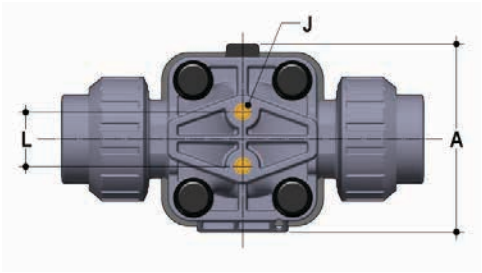
Accessories

Fastening and Supporting

All valves, whether manual or actuated, must be adequately supported in many applications.

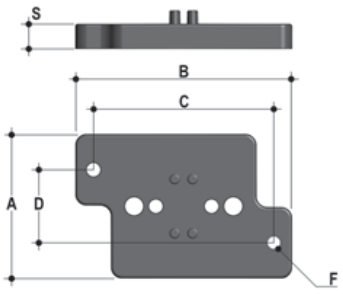
The DKD series provides an integrated bracket that permits direct anchoring of the valve body without the need of other components.

For wall or panel installation, dedicated PMDK mounting plates which are available as accessories can be used. These plates should be fastened to the valve before wall installation.



Dimension (inches)

Size	A	L	J
1/2	2.91	0.98	M6 x 10
3/4	2.91	0.98	M6 x 10
1	3.43	0.98	M6 x 10
1-1/4	3.43	0.98	M6 x 10
1-1/2	4.49	1.75	M8 x 14
2	5.35	1.75	M8 x 14



PMDK – Wall mounting Plate (Dimension in inches)

Size	A	B	C	D	F	S	IPEX Part Number	Significant Part Number
1/2" – 1-1/4"	2.56	3.82	3.19	1.30	0.22	0.43	154468	KITPMDK1
1-1/2" – 2"	2.56	5.67	5.12	1.30	0.26	0.43	154469	KITPMDK2

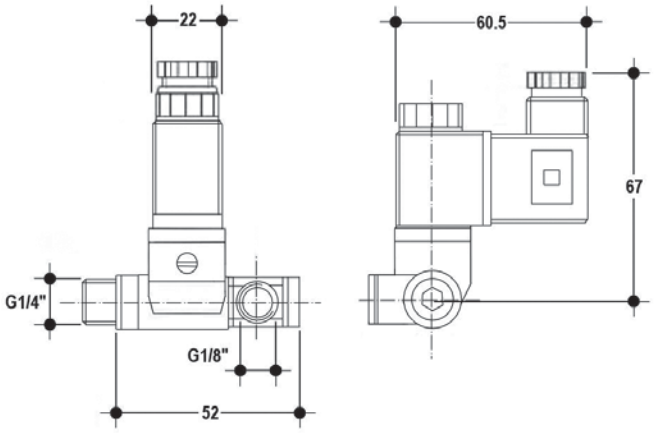
DKD Series Diaphragm Valves

Product Data Sheet

Technical Data Sheet – 3/2 Way Pilot Valve Type

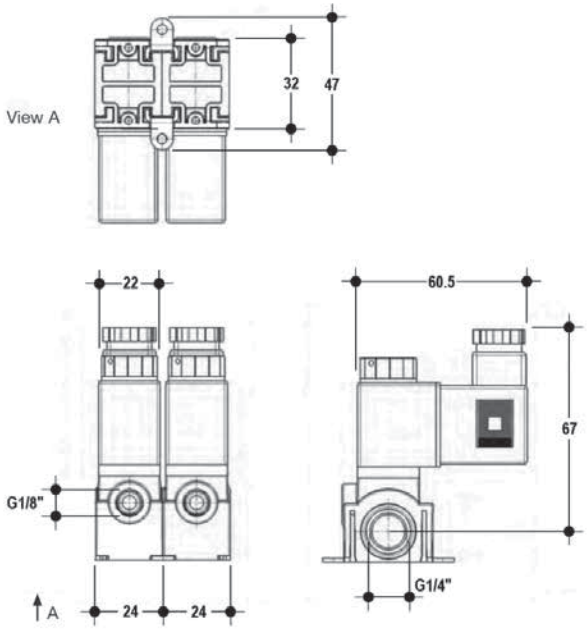
SD/NC

Direct mounting 3/2 way solenoid valve Normally Closed
for single acting actuators (NC and NO)



SM/NC

Manifold mounting 3/2 way solenoid valve Normally
Closed for single acting actuators DN10-50 (NC and NO)



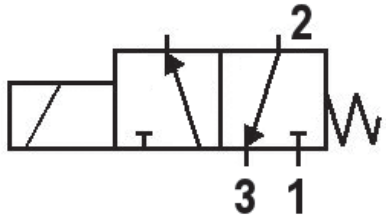
DKD Series Diaphragm Valves

Product Data Sheet

Technical Data Sheet – 3/2 Way Pilot Valve Type

Technical Data		
Size (DN)	1.2 mm	
Installation Position	Any	
Function	Normally Closed	
Pneumatic Connections	Model SD	Model SM
Air Supply	G 1/8"	G 1/4"
User	G 1/4"	G 1/8"
Housing Material	PA	
Seal Material	NBR – FPM* (on request)	
Features of Control Media	Filtered, lubricated or non-lubricated air	
Ambient Temperature	-10°C – +55°C	
Media Temperature	-10°C – +55°C	
Working Pressure	0 – 10 bar	
Flow Rate	60 NL	
Switching Frequency	max 5 Hz	
Switching Time	ON: 11 ms / OFF: 20 ms	
Voltage	12V DC* - 24V DC - 48V DC* 24V AC - 110V AC - 230V AC(50 Hz)	
Voltage Tollerance	+/- 10%	
Power Consumption	3W / 4,8W	
Electrical Connections	Connector	
Protection Class	IP65	
Available Options*	UL-Approved	

* On request



Model	Function	Voltage	Code
SD	NC	24V DC	
		24V AC	
		110V DC	
		230V DC	
SM		24V DC	
		24V DC	
		110V DC	
		230V DC	

DKD Series Diaphragm Valves

Product Data Sheet

Sample Specifications

1. GENERAL

1.1 DEFINITIONS

A. EPDM: Ethylene Propylene Diene Monomer Elastomer.
B. FPM: Flouropolymer.
C. PVC: Polyvinyl chloride Plastic.
D. PE: Polyethylene.
E. GFPP: Glass Filled Polypropylene.
F. SS: Stainless Steel.

2. PRODUCTS

2.1 DIRECT ACTING DIAPRAGM VALVES

A. Direct Acting Diaphragm Valves:

1. The basis of design is the IPEX DKD Series diaphragm valve:

a. Body:
1. Xirtec® 140 Schedule 80 PVC, cell class 12454 per ASTM D1784.
b. Body Color: Dark Grey.
c. Bonnet Color: Black.
d. Design:
1. Fail position: normally open
2. GFPP bonnet with 316 SS nuts and bolts and PE plugs.
3. All wetted components shall comply with NSF Standard 61 for potable water.
4. All valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.
5. Temperature Range: 32°F to 140°F
6. Nominal pressure rating: 120 PSI @ 73°F
e. Size: As specified on the drawings.
f. End connection type:
1. IPS Socket shall conform to dimensional standard ASTM D2466 and ASTM D2467.
2. IPS Spigot shall conform to dimensional standard ASTM D1785.
3. Female NPT Thread shall conform to dimensional standard ASTM D1785.
g. Diaphragm Material:
1. EPDM.
h. O-rings
1. EPDM.
i. Actuator:
1. Media:
a. Air.
b. Water.
2. Operation: On / Off flow control.
3. Fail Position: Normally Open.
4. Control media connection: 1/4" Threaded NPT.

5. Maximum allowable control pressure: 145 PSI at 73°F
6. Control temperature range: -4°F to 120°F

j. Accessories:

1. The contractor shall supply and furnish IPEX's wall mounting plate as required to secure the DKD diaphragm valve to the wall.
2. The contractor shall supply a 3/2 ways electromagnetic pilot solenoid valve for direct or manifold mounting.
   a. 24V DC Voltage
   b. Operating temperature range 15°F to 130°F
   c. Working pressure: 145 PSI
   d. 100% Duty Cycle
   e. IP65 enclosure rating
   f. FPM will be used as the seal material
   g. UL/CSA listing
   h. The pilot solenoid control valve shall be supplied by the valve manufacturer

2. Acceptable Manufacturers

a. IPEX

b. Or approved alternate

1. Requests for alternate material must be approved by the consulting engineer prior to the bid closing date.

3. EXECUTION

3.1 EXAMINATION

A. Valve Interiors: Clean and free of foreign matter, and corrosion. Remove packing used to prevent valve movement.

1. Operate valves from fully open to fully closed positions.
2. Verify guides and seats are clean and free of foreign matter, and corrosion.

B. Threads on Valves Fittings and Fixtures: Inspect valve and mating pipe for form and cleanliness.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 VALVE INSTALLATION

A. Install products in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

1. Valves in horizontal piping to have stems at or above pipe center.
2. Valves to be positioned allowing full movement.
3. Valves with threaded connections to have unions at each piece of equipment.
   a. Arrange to allow easy access, service, maintenance, and equipment removal without system shutdown. Provide separate support where necessary.

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

Installation Procedures

1. The valve may be installed in any position or direction.
2. Please refer to the appropriate connection style sub-section:
    a. For spigot style, solvent cement each pipe onto the ends of the valve body. Ensure that excess solvent does not run into the body of the valve.
    b. For true union style, remove the union nuts and slide them onto the pipe.
        i. For socket style, solvent cement the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods - Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". E**nsure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.**
        ii. For threaded style, thread the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods - Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
        iii. Ensure that the socket o-rings are properly fitted in their grooves then carefully place the valve in the system between the two end connections.
        iv. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**
    c. For flanged style, join both flanges to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. **Connect a suitable air supply and pilot system to the actuator. Be sure to check that both the working and control pressure are in accordance with the specifications.**
4. If anchoring is required, fix the valve to the supporting structure using the mounting holes on the bottom of the valve body.

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. Be sure to depressurize and drain the valve and isolated branch. **Depressurize and disconnect the pneumatic control line before continuing with disassembly.**
2. If necessary, detach the valve from the support structure by disassembling the threaded connections on the bottom of the valve body.
3. Please refer to the appropriate connection style sub-section:
    a. For spigot style, cut the pipe on either side of the valve and remove from the line.
    b. For true union connections, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings, take care that they are not lost when removing the valve from the line.
4. Remove the protective caps then loosen and remove the bolts and washers from the bottom of the valve body.
5. Remove the diaphragm from the valve body.
6. The valve components can now be checked for problems and/or replaced.

NOTE: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Position the diaphragm on the bonnet.
2. Place the bonnet and diaphragm onto the valve body taking care to properly line up the sealing surfaces.
3. Insert the bolts and washers and tighten in an even (cross-like) pattern.
4. Replace the protective caps.

About IPEX

About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the world's largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems
- PVC, CPVC, PP, PVDF, PE, ABS, and PEX pipe and fittings