Model DF2410 Control Valves

Technical Sales Bulletin

Figure 1 *DF2410 Control Valve*

The Model DF2410 Control Valve is a rugged globe style control valve intended for demanding applications in process control. It is suitable for a wide range of applications, especially high pressure and severe service. The compact design makes installation and maintenance more convenient than traditional valve and actuator assemblies while still offering the same functionality. The Model DF2410 is designed to accept instrumentation requiring valve stem linkages making it an excellent control valve.

Incorporated into the design are features that assure easy and safe maintenance. Maintenance can be performed with the valve body in line.

The Dyna-Flo DF2410 control valve is manufactured to a high level of quality to ensure superior performance and customer satisfaction.

Features

NACE Service Ready
Standard construction for the DF2410 control valve features NACE trim. The valve bonnet and body also conform to NACE MR075 (National Association of Corrosion Engineers) recommendations.

Live Loaded Packing
Packing for the DF2410 control valve is designed to provide a quality stem seal and to prevent the loss of hazardous gases or fluids. The live loaded feature provides for reduced maintenance and positive sealing in temperature and pressure cycling conditions.

Easy Trim Changes
Bonnet and actuator removal is easily accomplished by loosening the hammer nut. Unique plug with quick-lock pin allows for easy removal and replacement without the need for punches and hammers. The seat ring is removed using the same tool as the corresponding size DF2000. The hammer nut allows for easy bonnet removal and access while the valve is still in line.

Simple Installation
The DF2410 control valves compact design allows for easy installation in tight areas where space is limited.

Low Temperature Materials
The DF2410 valve and actuator are constructed with materials that are capable of functioning in temperatures of -40°C (-40°F).

Compact Design
The DF2410 control valve is light weight for easy installation and handling. DF2410 control valves compact design makes it ideal for tight fitting applications.

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SPECIFICATIONS

Port Diameters
1/4", 3/8", 1/2", 3/4", 1", and 1-1/4"
Refer to Table 1.

Sizes and Connection Styles

Size:	2 inch
Rating:	ASME 150 / 300 / 600 / 900 / 1500 NPT: 2,250 Psi (155 bar) CWP
Connections:	NPT / RF / RTJ

Refer to Table 1 for details and Port Diameters.

Maximum Inlet Temperatures and Pressures
Flanged valves consistent with ASME Class rating as per ASME B16.34, unless limited by either material pressure or temperature limitations.

Maximum Pressure Drops
Refer to Tables 10, 11, 12 & 13.

Standard Shut-off Classifications
Class IV Shut-off in accordance with ASME / FCI 70.2.

Dimensions
Fail Closed Valve Configuration Dimensions
Refer to Figure 4.
Fail Open Valve Configuration Dimensions
Refer to Figure 5.

Flow Characteristics
Equal Percentage.

Flow Direction
Preferred Up (Refer to Tables 6 & 7).

Valve Plug Travel
3/4 inch (19 mm).

Approximate Valve Body and Actuator Weights
Refer to Table 1.

Material Temperature Capabilities
Body Assembly
-46 to 150ºC (-50 to 300ºF)
Actuator Assembly
-40 to 82ºC (-40 to 180ºF)

Body Style
Available in Globe style.

Bonnet/Body Connection
Threaded Hammer Nut.

Actuator Configuration
The DF2410 utilizes a spring and diaphragm actuator suitable for modulating. Available in either Fail Open or Fail Closed configurations, actuator fail position is not field reversible.

Maximum Actuator Casing Pressure
50 Psig (3.45 bar).

Effective Actuator Diaphragm Area
69 inches² (452 cm²).

Actuator Pressure Connections
NPS 1/4 inch NPT.

Valve Sizing Coefficients
Refer to Table 2.

For more information and other options contact your Dyna-Flo sales office.

Table 1

Available Valve Sizes, Connection Styles and Approximate Weights

Port Diameter inch (mm)	Connection Style						
	Threaded lb (kg)	Raised Face (RF) Flanged lb (kg)				Ring Type Joint (RTJ) Flanged lb (kg)	
1/4 (6.40) 3/8 (9.50) 1/2 (12.7) 3/4 (19.1) 1 (25.4) 1-1/4 (38.1)	**NPT**	**Class 150**	**Class 300**	**Class 600**	**Class 900/1500**	**Class 600**	**Class 900/1500**
	87 (39)	87 (39)	106 (48)	106 (48)	146 (66)	106 (48)	146 (66)

Table 2

Valve Sizing Coefficients, for Equal Percentage Trim

Port Size	Coefficient	Percentage of Valve Travel									
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1/4 Inch (6.40 mm)	C_V	0.08	0.115	0.164	0.224	0.315	0.45	0.641	0.921	1.28	1.64
	X_T	0.783	0.783	0.744	0.691	0.625	0.614	0.608	0.611	0.61	0.610
	F_L	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
3/8 Inch (9.50 mm)	C_V	0.155	0.26	0.407	0.596	0.858	1.21	1.65	2.22	3.00	4.03
	X_T	0.625	0.535	0.534	0.539	0.535	0.535	0.538	0.534	0.537	0.536
	F_L	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
1/2 Inch (12.7 mm)	C_V	0.348	0.505	0.709	0.996	1.38	1.92	2.69	3.82	5.25	6.82
	X_T	0.613	0.627	0.585	0.576	0.565	0.553	0.535	0.509	0.49	0.501
	F_L	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
3/4 Inch (19.1 mm)	C_V	0.613	0.952	1.44	2.06	2.92	4.13	5.86	8.16	11.1	14.0
	X_T	0.581	0.616	0.581	0.586	0.581	0.573	5.49	0.541	0.529	0.528
	F_L	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
1 Inch (25.4 mm)	C_V	1.20	1.68	2.44	3.53	5.05	7.28	10.5	14.0	18.4	23.7
	X_T	0.517	0.569	0.559	0.542	0.544	0.54	0.507	0.508	0.507	0.508
	F_L	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
1-1/4 Inch (38.1 mm)	C_V	1.32	1.76	2.49	3.66	5.42	8.23	12.7	20.6	28.9	34.5
	X_T	0.521	0.563	0.548	0.534	0.498	0.503	0.553	0.528	0.524	0.579
	F_L	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

Relationships of Note: $C_1 = 39.76\sqrt{X_T}$ $C_G = C_V C_1$ $K_M = F_L^2$

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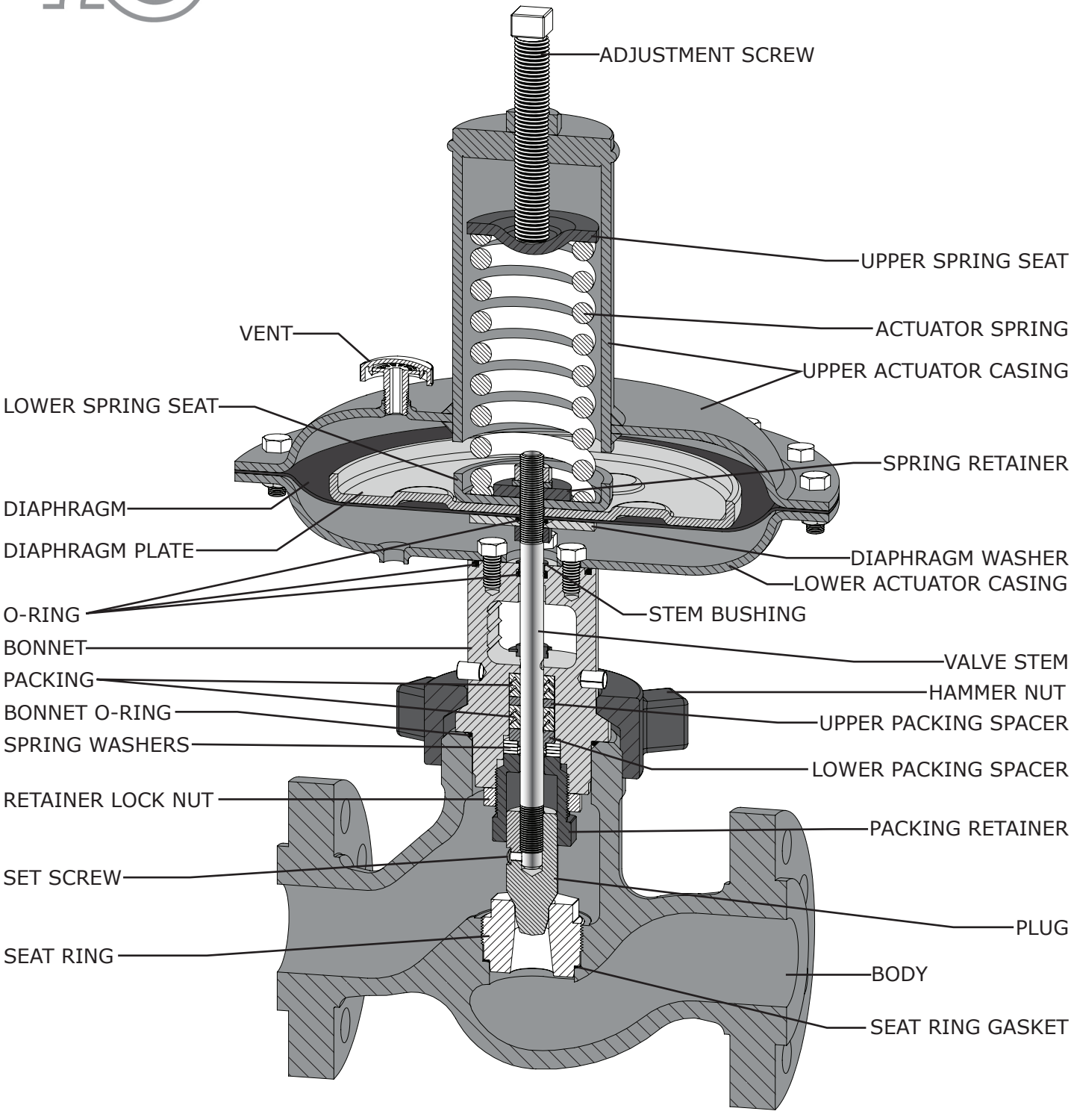

Figure 2 *Fail Closed Valve Cross Section*

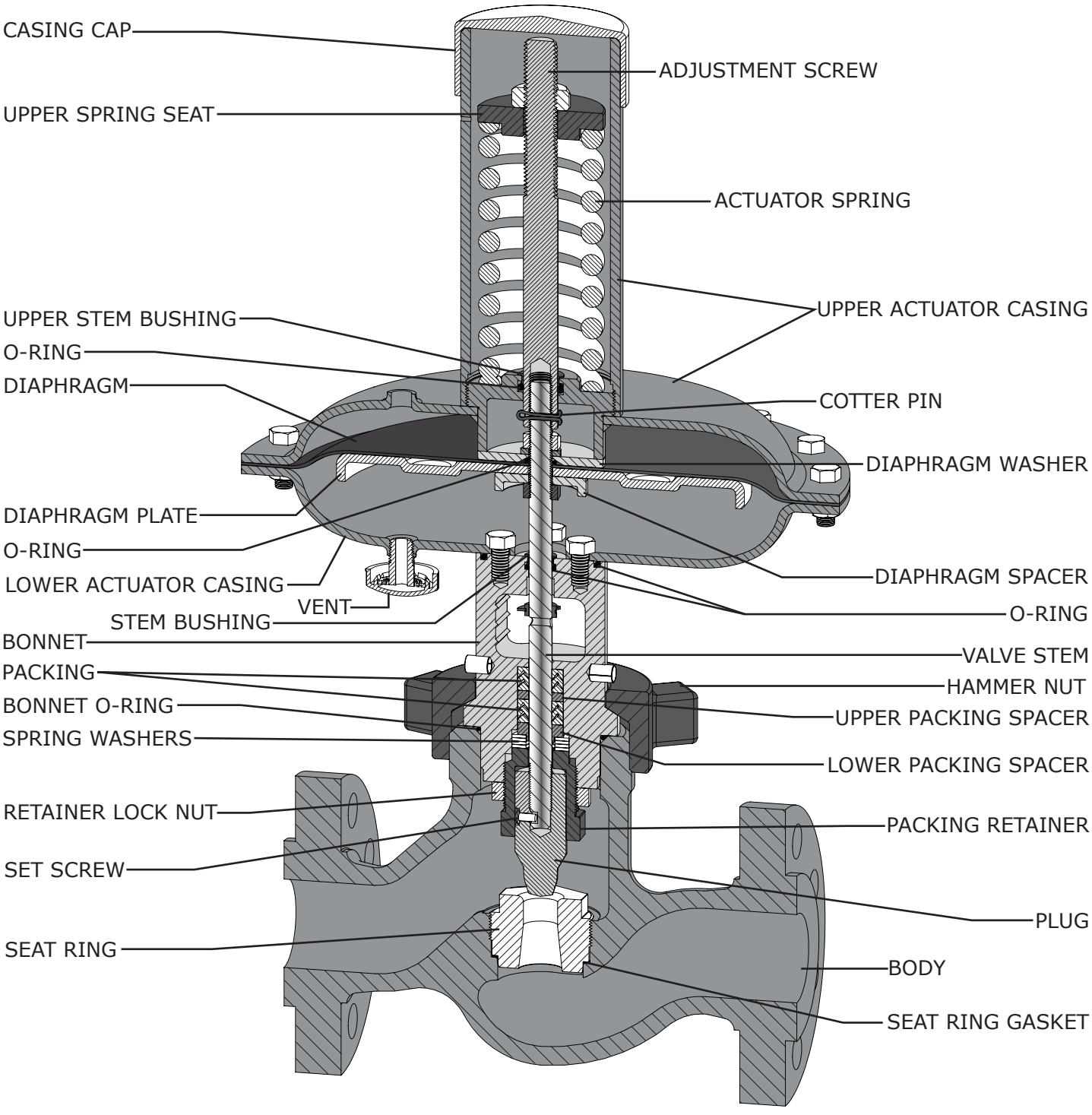

Figure 3 *Fail Open Valve Cross Section*

Table 3

Standard Construction Materials

Part Description	Standard Construction
Valve Body	LCC
Bonnet	LCC
Hammer Nut	LCC
Valve Plug	S17400 DH1150 (NACE), S31600(1)/Tungsten Carbide (optional)
Valve Plug Set Screw	18-8
Seat Ring	S17400 DH1150 (NACE), S31600(1)/Tungsten Carbide (optional)
Seat Ring Gasket	S30400
Valve Stem	S20910
Actuator Spring	Steel
Adjustment Screw	Zinc Plated Steel
Bonnet O-Ring	HNBR
Diaphragm	Nitrile/Nylon
Diaphragm Plate	Steel
Casing O-Ring	HNBR
Lower Casing	Steel/Zinc
Lower Packing Spacer	S31600(1)
Lower Spring Seat	Zinc Plated Steel
Packing	PTFE/CPTFE
Packing Retainer	S17400 PH
Retainer Lock Nut	S31600(1)
Spring Washers	N07718
Stem Bushing	Nylon
Stem O-Ring	HNBR
Upper Casing Assembly	Steel/Zinc
Upper Packing Spacer	S31600(1)
Upper Spring Seat	S31600(1)

NOTES: **1** - All S31600 barstock is dual grade S31600/S31603 (316/316L)

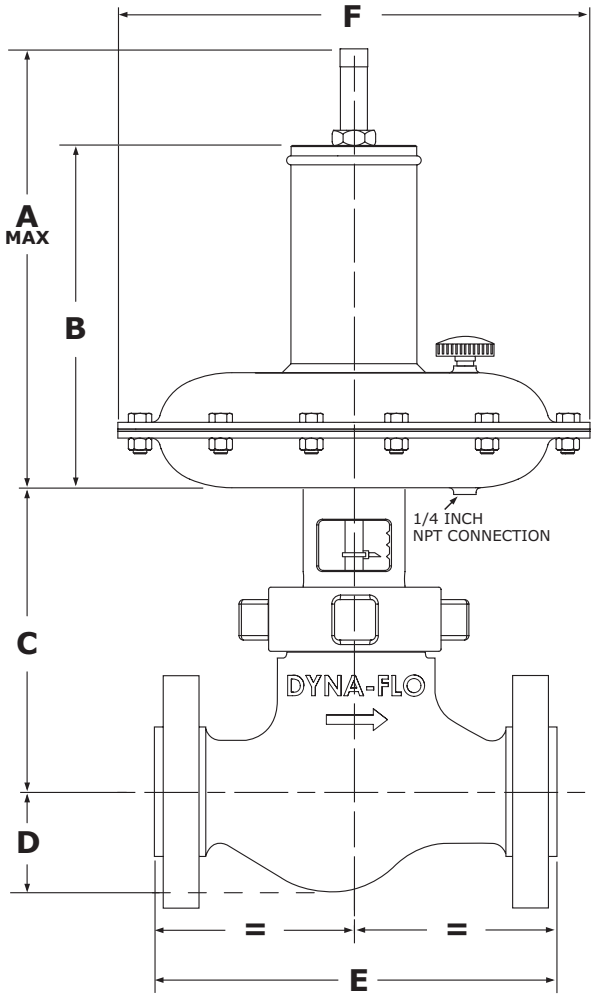

Figure 4 *DF2410 Fail Closed Valve Dimensions*

Table 4

DF2410 Fail Closed Dimensions

Key	Dimensions inch (mm)
A Max	12.30 (312)
B	9.50 (241)
F	13.10 (333)

Table 5

DF2410 Fail Closed Dimensions inch (mm)

	Key		
Connection Style	**C**	**D**	**E**
NPT	8.47 (215)	2.75 (70)	9.00 (230)
Class 150 RF Flanged	8.47 (215)	2.75 (70)	10.50 (267)
Class 300 RF Flanged	8.47 (215)	2.75 (70)	10.50 (267)
Class 600 RF Flanged	8.47 (215)	2.75 (70)	11.25 (286)
Class 900/1500 RF Flanged	8.47 (215)	2.75 (70)	12.12 (308)
Class 600 RTJ Flanged	8.47 (215)	2.75 (70)	11.38 (289)
Class 900/1500 RTJ Flanged	8.47 (215)	2.75 (70)	12.25 (311)

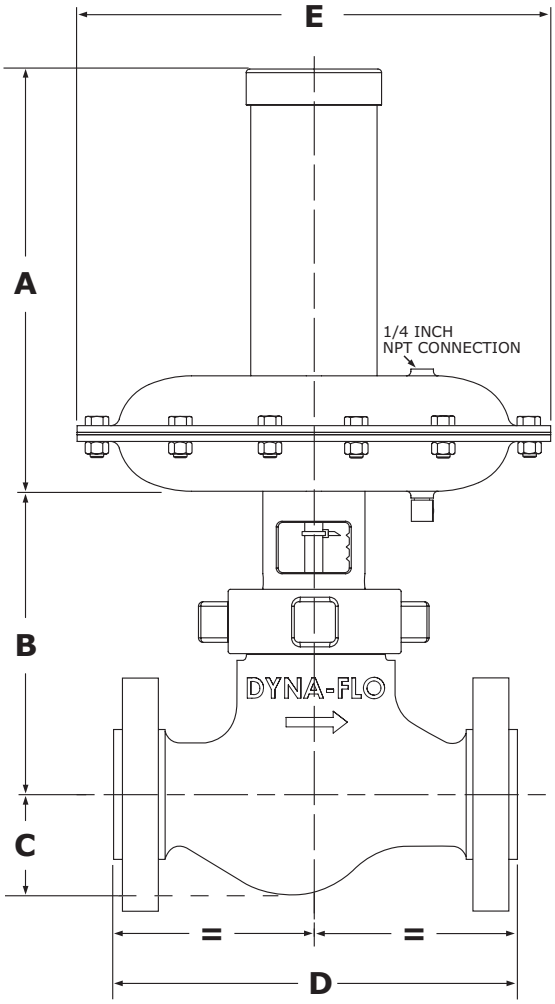

Figure 5 *DF2410 Fail Open Valve Dimensions*

Table 6

DF2410 Fail Open Dimensions

Key	**Dimensions** inch (mm)
A	12.75 (323)
E	13.10 (333)

Table 7

2" DF2410 Fail Open Dimensions inch (mm)

	Key		
Connection Style	**B**	**C**	**D**
NPT	8.47 (215)	2.75 (70)	9.00 (229)
Class 150 RF Flanged	8.47 (215)	2.75 (70)	10.50 (267)
Class 300 RF Flanged	8.47 (215)	2.75 (70)	10.50 (267)
Class 600 RF Flanged	8.47 (215)	2.75 (70)	11.25 (286)
Class 900/1500 RF Flanged	8.47 (215)	2.75 (70)	12.12 (308)
Class 600 RTJ Flanged	8.47 (215)	2.75 (70)	11.38 (289)
Class 900/1500 RTJ Flanged	8.47 (215)	2.75 (70)	12.25 (311)

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Table 8

Maximum Shut-off Pressure Drops[3] for a Fail Closed DF2410 When used with common instrumentation[1]

Actuator Input Signal	0 to 18 Psig (0 to 1.24 bar)	0 to 20 Psig (0 to 1.38 bar)	0 to 30 Psig (0 to 2.07 bar)	0 to 33 Psig (0 to 2.28 bar)	0 to 35 Psig (0 to 2.41 bar)	0 to 50 Psig (0 to 3.45 bar)
Spring	**Light Spring**		**Heavy Spring**			
Initial Spring Setting	11.0 Psig (0.76 bar)	11.0 Psig (0.76 bar)	12.5 Psig (0.86 bar)	15.5 Psig (1.07 bar)	17.0 Psig (1.17 bar)	17.0 Psig (1.17 bar)
Port Diameter inch (mm)	**Maximum Pressure Drop** Psi (bar)					
1/4 (6.40)	3,750 (259)[2]	3,750 (259)[2]	3,750 (259)	3,750 (259)	3,750 (259)	3,750 (259)
3/8 (9.50)	3,750 (259)[2]	3,750 (259)[2]	3,750 (259)	3,750 (259)	3,750 (259)	3,750 (259)
1/2 (12.7)	2,765 (191)	2,765 (191)	3,180 (219)	3,750 (259)	3,750 (259)	3,750 (259)
3/4 (19.1)	1,160 (80)	1,160 (80)	1,340 (92)	1,785 (123)	2,080 (143)	2,080 (143)
1 (25.4)	610 (42)	610 (42)	715 (49)	965 (67)	1,130 (78)	1,130 (78)
1-1/4 (31.8)	365 (25)	365 (25)	430 (30)	590 (41)	700 (48)	700 (48)

Notes:

1 - When using an instrument such as a positioner or controller with a 3-15 Psi (0.21-1.05 bar) input signal use the 0 to 20 Psig column (Light Spring).

2 - For applications where downstream pressure exceeds 2,845 Psig (196 bar), 2,845 Psi should be used as the Maximum Shut-off Pressure.

3 - Do not exceed the Pressure Temperature Limitations as per ASME B16.34.

Table 9

Maximum Shut-off Pressure Drops[3] for a Fail Closed DF2410 When used with restricted output range instrumentation[1]

Actuator Input Signal	**6 to 30 Psig (0.41 to 2.07 bar)**
Initial Spring Setting	**14 Psig (0.97 bar)** (Heavy Duty Spring)
Port Diameter inch (mm)	**Maximum Pressure Drop** Psi (bar)
1/4 (6.40)	3,750 (259)[2]
3/8 (9.50)	3,045 (210)[2]
1/2 (12.7)	1,635 (113)
3/4 (19.1)	655 (45)
1 (25.4)	330 (23)
1-1/4 (31.8)	185 (13)

NOTES:

1 - Example: for a Electro-Pneumatic Transducer calibrated for 6 to 30 Psig (0.41 to 2.07 bar).

2 - For valve use where downstream pressure exceeds 1,715 Psig (118 bar), 1,715 Psig should be used as the Maximum Shut-off Pressure.

3 - Do not exceed the Pressure Temperature Limitations as per ASME B16.34.

Table 10

Maximum Shut-off Pressure Drops[3] for a Fail Open DF2410 When used with common instrumentation[1]

Actuator Input Signal	0 to 18 Psig (0 to 1.24 bar)	0 to 20 Psig (0 to 1.38 bar)	0 to 30 Psig (0 to 2.07 bar)	0 to 33 Psig (0 to 2.28 bar)	0 to 35 Psig (0 to 2.41 bar)	0 to 50 Psig (0 to 3.45 bar)
Spring	**Light Spring**		**Heavy Spring**			
Initial Spring Setting	3.5 Psig (0.24 bar)	3.5 Psig (0.24 bar)	4.0 Psig (0.28 bar)	4.0 Psig (0.28 bar)	4.0 Psig (0.28 bar)	4.0 Psig (0.28 bar)
Port Diameter inch (mm)	**Maximum Pressure Drop** Psi (bar)					
1/4 (6.40)	3,750 (259)[2]	3,750 (259)[2]	3,750 (259)	3,750 (259)	3,750 (259)	3,750 (259)
3/8 (9.50)	3,750 (259)[2]	3,750 (259)[2]	3,750 (259)	3,750 (259)	3,750 (259)	3,750 (259)
1/2 (12.7)	2,715 (187)	3,380 (233)	3,750 (259)	3,750 (259)	3,750 (259)	3,750 (259)
3/4 (19.1)	1,135 (78)	1,430 (99)	2,130 (147)	2,575 (178)	2,875 (198)	3,750 (259)
1 (25.4)	600 (41)	765 (53)	1,160 (80)	1,410 (97)	1,575 (109)	2,830 (195)
1-1/4 (31.8)	355 (24)	465 (32)	715 (49)	875 (60)	985 (68)	1,785 (123)

NOTES:

1 - When using an instrument such as a positioner or controller with a 3-15 Psi (0.21-1.05 bar) input signal use the 0 to 20 Psig column (Light Spring).

2 - For valve use where downstream pressure exceeds 2,750 Psig (190 bar), 2,750 Psig should be used as the Maximum Shut-off Pressure.

3 - Do not exceed the Pressure Temperature Limitations as per ASME B16.34.

Table 11

Maximum Shut-off Pressure Drops[3] for a Fail Open DF2410 When used with restricted output range instrumentation[1]

Actuator Input Signal	**6 to 30 Psig (0.41 to 2.07 bar)**
Initial Spring Setting	**10 Psig (0.69 bar)** (Heavy Duty Spring)
Port Diameter inch (mm)	**Maximum Pressure Drop** Psi (bar)
1/4 (6.40)	3,750 (259)[2]
3/8 (9.50)	3,750 (259)[2]
1/2 (12.7)	2,845 (196)
3/4 (19.1)	1,195 (82)
1 (25.4)	630 (43)
1-1/4 (31.8)	380 (26)

NOTES:

1 - Example: for a Electro-Pneumatic Transducer calibrated for 6 to 30 Psig (0.41 to 2.07 bar).

2 - For valve use where downstream pressure exceeds 2,925 Psig (202 bar), 2,925 Psig should be used as the Maximum Shut-off Pressure.

3 - Do not exceed the Pressure Temperature Limitations as per ASME B16.34.

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Model DF2410 Control Valves

MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: DF2410-2C0-BN-2B

							ACTUATOR STYLE	**C**
C	FAIL CLOSED	**O**	FAIL OPENED					
							INPUT SIGNAL	**0**
0	0-18 PSIG (0-1.24 BAR)			**2**	0-20 PSIG (0-1.38 BAR)			
1	0-33 PSIG (0-2.28 BAR)			**3**	0-35 PSIG (0-2.41 BAR)			
4	0-50 PSIG (0-3.45 BAR)			**6**	6-30 PSIG (0.41-2.07 BAR)			
							ASME RATING	**B**
A	150	**B**	300	**C**	600	**D**	900/1500	
E	3750 PSI (NPT)							
							CONNECTION STYLE	**N**
N	FNPT	**F**	RF	**J**	RTJ			
							PORT DIAMETER	**2**
2	1/4 INCH	**3**	3/8 INCH	**4**	1/2 INCH	**6**	3/4 INCH	
8	1 INCH	**1**	1-1/4 INCH					
							TRIM MATERIAL	**B**
B	S17400 DH 1150 (NACE)			**D**	TUNGSTEN CARBIDE			

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