

Model DF270 Control Valves

Technical Sales Bulletin



Figure 1 DF270 Control Valve

The Dyna-Flo Model DF270 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 DF270 is designed to accept instrumentation requiring valve stem linkages making it an excellent control valve.

The Model DF270 is available in 1 inch and 2 inch sizes, either in a globe or angle style valve body with threaded FNPT or flanged connections.

The Dyna-Flo DF270 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 DF270 control valve features NACE trim. The valve bonnet and body also conform to NACE MR0175 (National Association of Corrosion Engineers) recommendations.

ASME Class 900/1500

The DF270 is designed and rated for ASME B16.34 Class 150 - 1500 service.

Live Loaded Packing

Packing for the DF270 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.

Field-Reversible Actuator

Field conversion of the DF270 actuator is designed to be quick and easy. Switch the DF270 from a spring-close to spring-open actuator without any additional parts.

Easily Maintained

The hammer union body to bonnet connection allows for easy removal of the bonnet/actuator for access to trim and packing. Trim removal requires no special tools and is quick and simple. The two piece cage seat allows replacement of the seat ring while using the existing cage making port changes and maintenance more economical.

Low Temperature Materials

The DF270 valve body is constructed with materials that are capable of functioning in temperatures of -40°C.

Open Yoke

The DF270 features an open yoke that allows for the mounting of a feedback arm to facilitate positioners and indicators.

Versatile Trim Material Options

Plug and seat ring materials are available in S17400 DH1150 and S30300 / Tungsten Carbide.



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SPECIFICATIONS

Port Diameters

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

Sizes and Connection Styles

Size: 1 & 2 inch
Rating: ASME 150 / 300 / 600 / 900 / 1500
FNPT: 2,250 Psi (15,513 kPa) CWP
Connections: FNPT / RF / RTJ
Refer to Table 1 for details and Port Diameters.

Maximum Pressure Drops

Refer to Tables 6 & 7.

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 150°C (-50 to 300°F)

Actuator Assembly

-40 to 82°C (-40 to 180°F)

Body Style

Available in Globe and Angle style.

Bonnet/Body Connection

Threaded Hammer Nut.

Actuator Configuration

The DF270 utilizes a spring and diaphragm actuator suitable for modulating. Fail action is field-reversible.

Maximum Actuator Casing Pressure

50 Psig (345 kPag).

Effective Actuator Diaphragm Area

69 inches² (452 cm²).

Actuator Pressure Connections

NPS 1/4 inch NPT.

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

Maximum Pressures and Temperatures ¹		
Valve Size	200°F (93°C)	300°F (150°C)
NPS 1 inch FNPT	2,250 Psig (15,513 kPag)	2,185 Psig (15,044 kPag)
NPS 1-2 inch Flanged Class 600	1,500 Psig (10,342 kPag)	1,454 Psig (10,024 kPag)
NPS 1-2 inch Flanged Class 900	2,250 Psig (15,513 kPag)	2,185 Psig (15,650 kPag)
NPS 2 inch Flanged Class 900/1500	3,750 Psig (25,855 kPag)	3,640 Psig (25,097 kPag)

¹ - The limitations shown are as per ASME B16.34. Refer to the pressure temperature ratings in this standard for all other flange ratings. Do not exceed these ratings.

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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 Inch Valve 1/4 (6.40) 3/8 (9.50) 1/2 (12.7) 3/4 (19.1) 1 (25.4)	FNPT	Class 150	Class 300	Class 600	Class 900	Class 600	Class 900
	40 (18)	44 (20)	50 (23)	50 (23)	79 (32)	50 (23)	79 (36)
	FNPT	Class 150	Class 300	Class 600	Class 900/1500	Class 600	Class 900/1500
	46 (21)	50 (23)	70 (32)	70 (32)	110 (32)	70 (32)	110 (50)

Table 2

1 Inch Valve Sizing Coefficients, for Equal Percentage Trim

Port Size	Co-efficient	Percentage of Valve Travel									
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1/4 Inch (6.40 mm)	C_v	0.06	0.08	0.11	0.16	0.22	0.34	0.54	0.77	1.07	1.37
	X_T	0.793	0.736	0.731	0.710	0.668	0.644	0.640	0.628	0.608	0.569
	F_L	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
3/8 Inch (9.50 mm)	C_v	0.12	0.22	0.31	0.41	0.52	0.72	1.05	1.70	2.50	3.30
	X_T	0.706	0.689	0.685	0.652	0.648	0.624	0.616	0.608	0.596	0.584
	F_L	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
1/2 Inch (12.7 mm)	C_v	0.21	0.34	0.51	0.80	1.22	1.71	2.40	3.30	4.43	5.50
	X_T	0.577	0.588	0.616	0.640	0.685	0.664	0.624	0.730	0.740	0.819
	F_L	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
3/4 Inch (19.1 mm)	C_v	0.39	0.65	0.91	1.35	2.05	3.15	4.72	6.45	8.29	10.4
	X_T	0.599	0.612	0.624	0.643	0.626	0.648	0.669	0.737	0.730	0.826
	F_L	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
1 Inch (25.4 mm)	C_v	0.70	1.10	1.80	2.20	2.70	3.70	5.80	8.10	10.5	13.0
	X_T	0.540	0.562	0.610	0.702	0.618	0.602	0.645	0.881	0.710	0.810
	F_L	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89

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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Table 3

2 Inch Valve Sizing Coefficients, for Equal Percentage Trim

Port Size	Co-efficient	Percentage of Valve Travel									
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1/4 Inch (6.40 mm)	C _v	0.06	0.08	0.11	0.16	0.22	0.34	0.54	0.77	1.07	1.37
	X _T	0.793	0.736	0.731	0.710	0.668	0.644	0.640	0.628	0.608	0.569
	F _L	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
3/8 Inch (9.50 mm)	C _v	0.12	0.22	0.31	0.41	0.52	0.72	1.05	1.70	2.50	3.30
	X _T	0.706	0.689	0.685	0.652	0.648	0.624	0.616	0.608	0.596	0.584
	F _L	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
1/2 Inch (12.7 mm)	C _v	0.21	0.34	0.51	0.80	1.22	1.71	2.40	3.30	4.43	5.50
	X _T	0.577	0.588	0.616	0.640	0.685	0.664	0.624	0.730	0.740	0.819
	F _L	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
3/4 Inch (19.1 mm)	C _v	0.42	0.71	0.99	1.47	2.22	3.41	5.35	7.50	9.71	12.2
	X _T	0.655	0.582	0.654	0.662	0.653	0.622	0.685	0.615	0.748	0.880
	F _L	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
1 Inch (25.4 mm)	C _v	0.47	0.98	1.90	3.30	5.00	7.10	9.60	13.8	16.3	18.4
	X _T	0.586	0.574	0.607	0.683	0.654	0.608	0.694	0.882	0.734	0.805
	F _L	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88

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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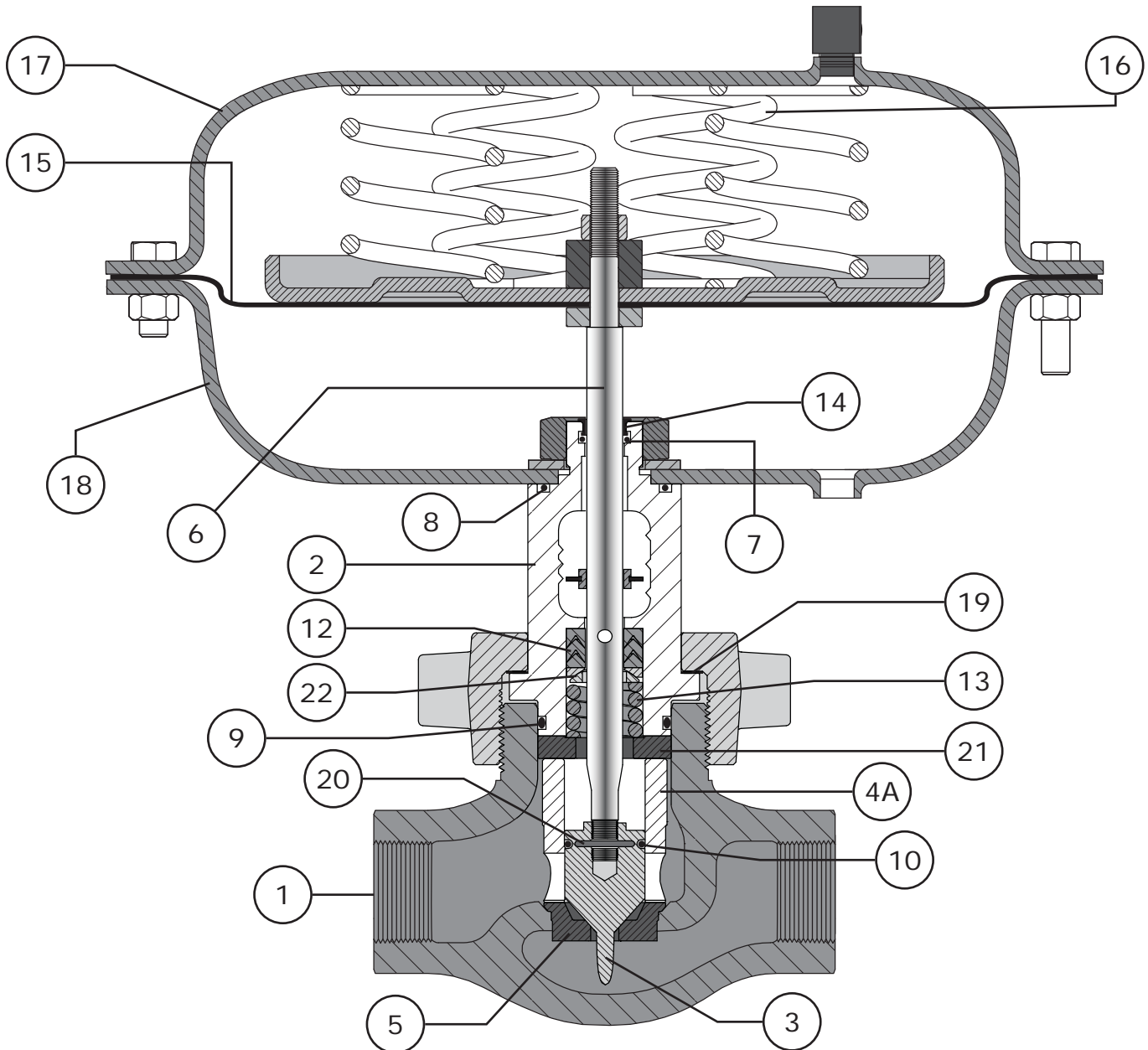


Figure 2 DF270 Fail Closed NPS 1 Inch Valve Cross Section



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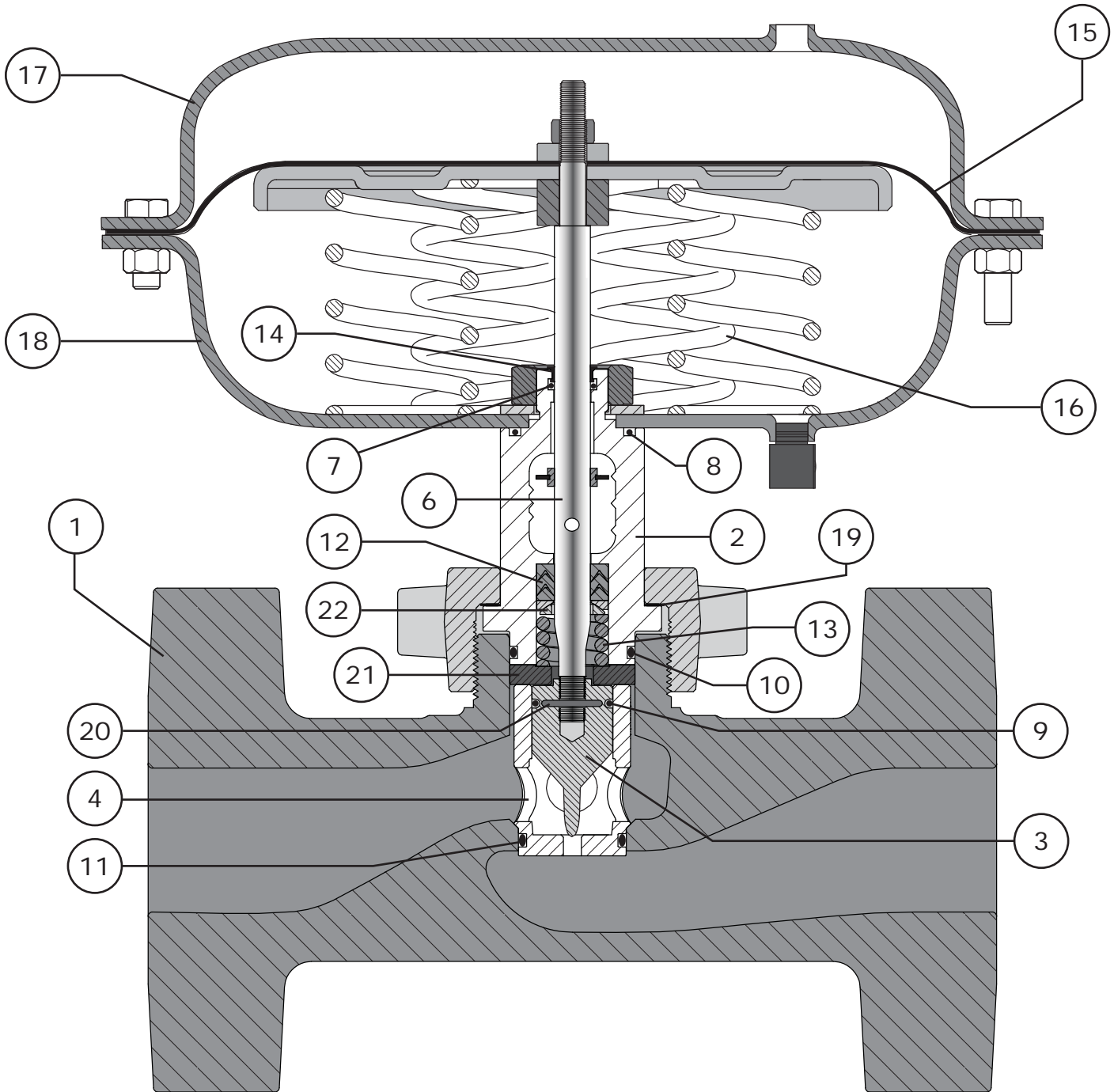


Figure 3 DF270 Fail Open 2 Inch Flanged Valve Cross Section

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Table 4

Standard Construction Materials		
Key	Part Description	Standard Construction
1	Valve Body	LCC
2	Bonnet	LCC
3	Valve Plug	S17400 DH1150 (NACE), S30300 / Tungsten Carbide (optional)
4	Cage/Seat Ring (1 Piece Design)	S17400 DH1150 (NACE), S30300
4A	Cage (2 Piece Design)	S17400 DH1150 (NACE), S30300 / Tungsten Carbide (optional)
5	Seat Ring (2 Piece Design)	S17400 DH1150 (NACE), S30300 / Tungsten Carbide (optional)
6	Valve Stem	S31600 - All S31600 barstock is dual grade S31600/S31603 (316/316L)
7, 8, 9, 10, 11	O-Ring	HNBR
12	Packing	PTFE / CPTFE
13	Spring	Inconel X750
14	Valve Stem Bushing	Nylon
15	Actuator Diaphragm	Nitrile / Nylon
16	Actuator Springs	Steel / Zinc
17	Upper Casing	Steel / Zinc
18	Lower Casing	Steel / Zinc
19	Washer	S30200
20	Pin	S31600 - All S31600 barstock is dual grade S31600/S31603 (316/316L)
21	Bonnet/Cage Spacer	S17400 DH1150 (NACE)
22	Spherical Washer	S31600 - All S31600 barstock is dual grade S31600/S31603 (316/316L)



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Table 5

NPT, RF, and RTJ Valve Dimensions Inches (mm)

Valve Size	Connection Style	A	B
1"	FNPT	6.25 (159)	3.13 (80)
	ASME 150 RF	7.25 (184)	3.63 (92)
	ASME 300 RF	7.75 (197)	3.88 (99)
	ASME 600 RF	8.25 (210)	4.13 (105)
	ASME 900 RF	9.38 (238)	4.69 (119)
	ASME 600 RTJ	8.25 (210)	4.13 (105)
	ASME 900 RTJ	9.38 (238)	4.69 (119)
2"	FNPT	7.50 (191)	3.75 (95)
	ASME 150 RF	10.00 (254)	5.00 (127)
	ASME 300 RF	10.50 (267)	5.25 (134)
	ASME 600 RF	11.25 (286)	5.63 (143)
	ASME 900/1500 RF	13.38 (340)	6.69 (170)
	ASME 600 RTJ	11.38 (289)	5.69 (145)
	ASME 900/1500 RTJ	13.50 (343)	6.75 (172)

NOTE: Refer to Figures 4 & 5

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Figure 4 DF270 1 inch Control Valve Dimensions inch (mm)

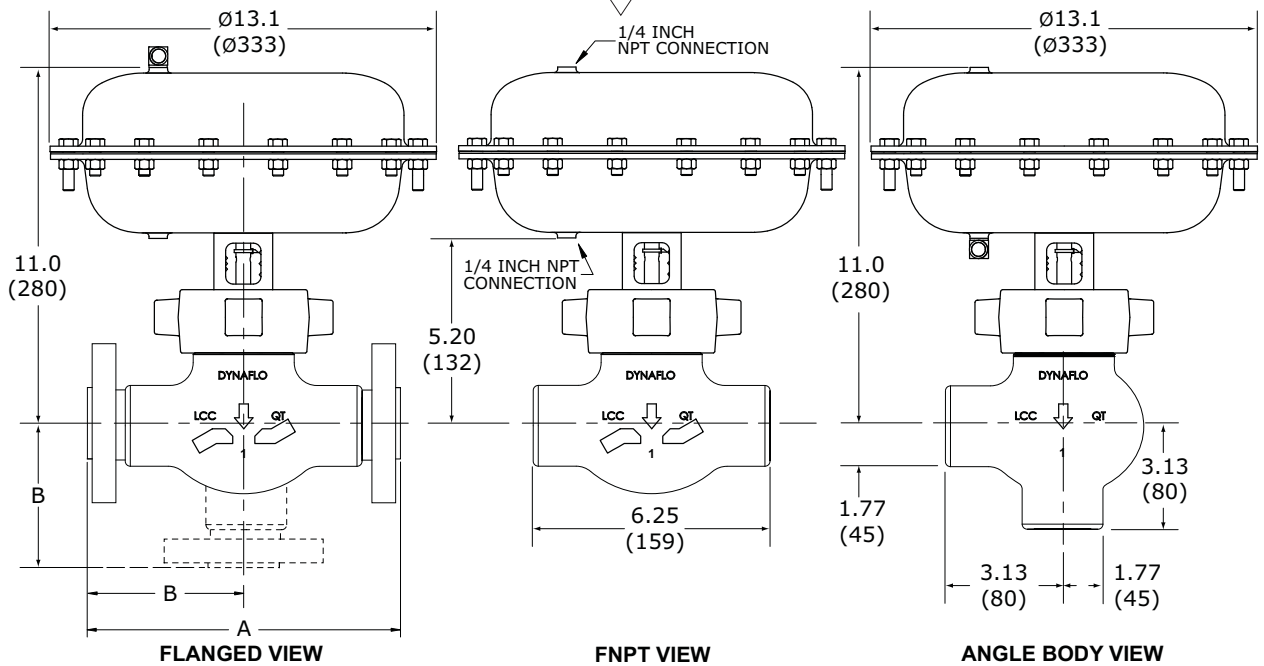
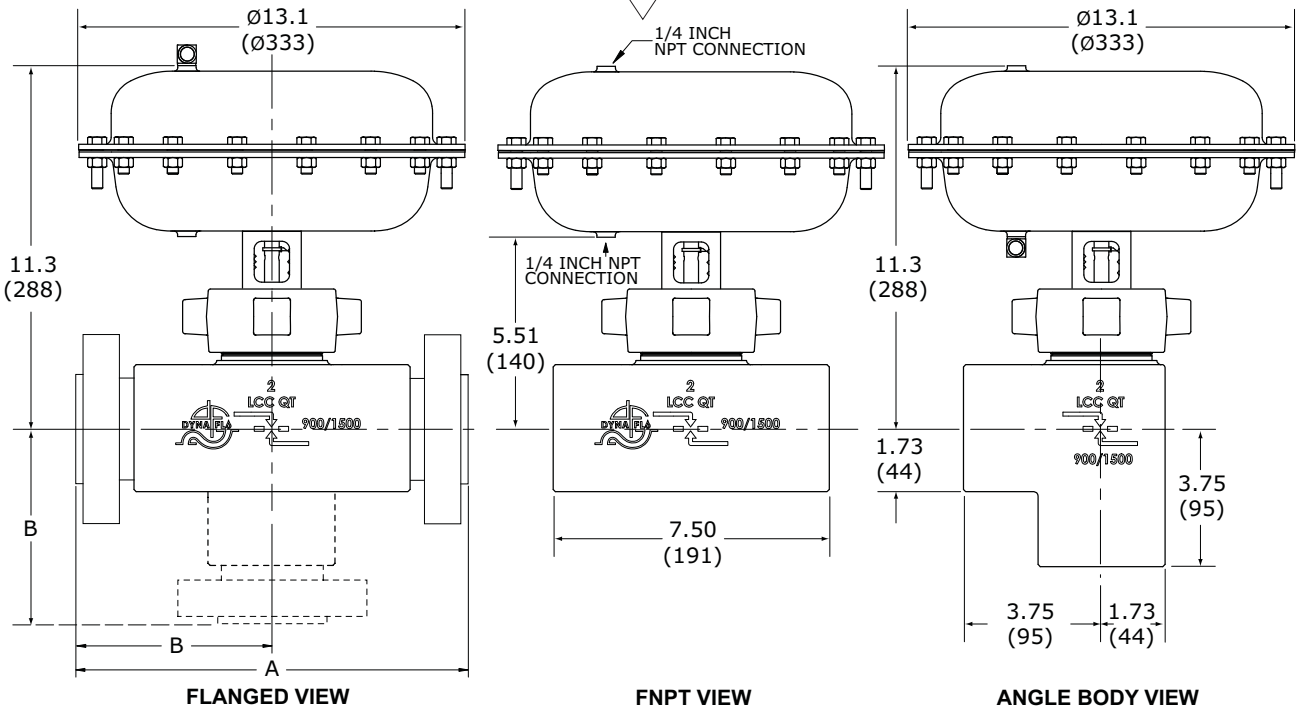


Figure 5 DF270 2 inch Control Valve Dimensions inch (mm)



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Table 6

FAIL CLOSED
Maximum Shut-off Pressure Drops⁽¹⁾ (Flow Up)

Port Diameter inch (mm)	Input Signal 0 - 20 Psig (0 - 138 kPag) 3 Springs	Input Signal 0 - 35 Psig (0 - 241 kPag) 6 Springs	Input Signal 3 - 15 Psig (20.7 - 103 kPag) 3 Springs	Input Signal 6 - 30 Psig (41.4 - 207 kPag) 6 Springs
1/4 (6.40)	2,250 (15,513)	2,250 (15,513)	2,250 (15,513)	2,250 (15,513)
3/8 (9.50)	2,250 (15,513)	2,250 (15,513)	1,979 (13,645)	2,250 (15,513)
1/2 (12.7)	2,007 (13,838)	2,250 (15,513)	1,033 (7,122)	2,250 (15,513)
3/4 (19.1)	803 (5,536)	1,873 (12,914)	388 (2,675)	989 (6,819)
1 (25.4)	402 (2,772)	1,004 (6,922)	178 (1,227)	516 (3,558)
NOTES:	1 - Do not exceed the Pressure Temperature Limitations as per ASME B16.34.			

Table 7

FAIL OPEN
Maximum Shut-off Pressure Drops⁽¹⁾ (Flow Up)

Port Diameter inch (mm)	Input Signal 0 - 20 Psig (0 - 138 kPag) 3 Springs	Input Signal 0 - 35 Psig (0 - 2.41 kPag) 3 Springs	Input Signal ⁽²⁾ 3 - 15 Psig (20.7 - 103 kPag) 3 Springs	Input Signal ⁽²⁾ 6 - 30 Psig (41.4 - 207 kPag) 3 Springs
1/4 (6.40)	2,250 (15,513)	2,250 (15,513)	N/A	N/A
3/8 (9.50)	2,250 (15,513)	2,250 (15,513)	N/A	N/A
1/2 (12.7)	2,250 (15,513)	2,250 (15,513)	N/A	N/A
3/4 (19.1)	1,412 (9,735)	2,250 (15,513)	N/A	N/A
1 (25.4)	744 (5,130)	2,062 (14,216)	N/A	N/A
NOTES:	1 - Do not exceed the Pressure Temperature Limitations as per ASME B16.34.			
	2 - Using a DF270 with an I/P having an output signal of 3-15 or 6-30, fail open is not recommended. The constant signal (3 or 6 Psig) to the actuator is higher than the initial set for both 3 or 6 spring configurations. This prevents the actuator from being able to fully open resulting in reduced flow rates, and possible trim damage.			

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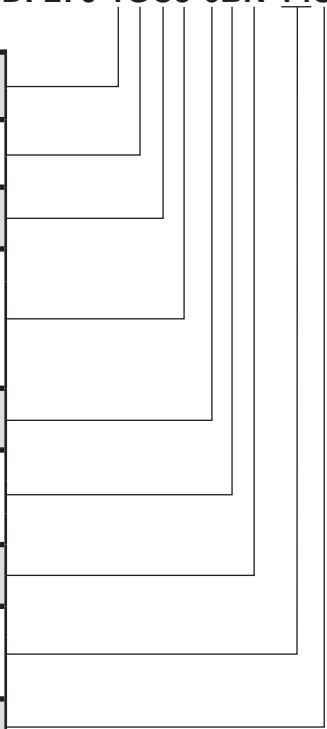


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MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: DF270-1GC3-6BN-14S

VALVE SIZE				1
1	1 INCH	2	2 INCH	
BODY STYLE				G
G	GLOBE STYLE	T	ANGLE STYLE	
ACTUATOR STYLE				C
C	FAIL CLOSED	O	FAIL OPENED	
SPRING RANGE ⁽¹⁾				3
3	SIZE 69 ACTUATOR WITH 0-20 PSIG OPERATING SIGNAL		6	SIZE 69 ACTUATOR WITH 0-35 PSIG OPERATING SIGNAL
2	SIZE 69 ACTUATOR WITH 3-15 PSIG OPERATING SIGNAL		5	SIZE 69 ACTUATOR WITH 6-30 PSIG OPERATING SIGNAL
NUMBER OF SPRINGS				6
3	3 SPRINGS	6	6 SPRINGS	
ASME RATING				B
A	150	B	300	C 600 D 900 ⁽²⁾
F	900 FNPT			
CONNECTION STYLE				N
N	FNPT	F	RF	J RTJ
TRIM SIZE				14
14	1/4 INCH	38	3/8 INCH	12 1/2 INCH 34 3/4 INCH
10	1 INCH			
TRIM MATERIAL				S
S	S17400 DH 1150	T	S30300 / TUNGSTEN CARBIDE	
NOTES				
1	Using a DF270 with an I/P having an output signal of 3-15 or 6-30, fail open is not recommended. The constant signal (3 or 6 Psig) to the actuator is higher than the initial set for both 3 or 6 spring configurations. This prevents the actuator from being able to fully open resulting in reduced flow rates, and possible trim damage.			
2	2 inch flanged bodies are class 900/1500.			



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