

VF Series

Butterfly Valve Bodies, 2 Through 20 in.



- low seating/unseating torques
- 2 through 12 in. valves are rated for dead-ended service up to 150 psig (1050 kPa).
- available with or without factory coupled pneumatic and electric actuators. These same actuators can also be field mounted. For kits and instructions, refer to *Linkage Kits for Field Coupling Johnson Controls Actuators to Johnson Controls Valves*.
- valve neck is extended to allow for two inches of insulation as well as easy access to the actuator
- 2 through 20 inch valves are fully lugged
- stem-to-disc coupling design features the exclusive "double D" connection
- without the use of stem retention screws, stem strength is maximized, servicing is simplified, and disc leakage is eliminated

Description

The VF Series Butterfly Valves are designed for a wide range of HVAC applications including two-position or modulating control of hot water, condenser, or chilled water.

Features

- compatible with all types of ANSI Class 125 / 150 slip-on and weld-neck flanges in two-way and three-way configurations
- bubble tight shutoff at 110% of full rated pressure with properly sized actuator
- valves are bidirectional which allows positive shutoff with flow in either direction

To Order

Refer to the selection chart on Page 5.

Specifications

VF Series Butterfly Valve Bodies, 2 Through 20 in.	
Product	VF Series Butterfly Valve Bodies
Service	Hot Water, Chilled Water, Condenser Water; Not For Use in Steam Applications
Body Styles and Sizes	Two-Way, 2 Through 20 in.
Maximum Pressure/Temperature	Exceeds Requirements of ANSI B16.1 Class 125 as Limited by Materials of Construction of Valve Assembly: 175 psi to 250°F (121°C)
Maximum Fluid Temperature	250°F (121°C)
Maximum Closeoff Pressure	Refer to <i>Pneumatic Valve and Actuator Selection Charts</i> and <i>Electric Valve and Actuator Selection Charts</i> .
Maximum Fluid Velocity	30 ft/second (9 m/second)
Materials	Body Cast Iron, Red Enamel Finish
	Disc Nodular Iron, Coated with Nylon 11
	Seat Ethylene Propylene Diene Monomer (EPDM)
	Stem Phosphatized Carbon Steel or 304, 316, or 416 Stainless Steel
Ambient Storage Temperature Limits	-20 to 150°F (-29 to 66°C)
Flow Characteristic	Equal Percentage
Manual Handlers and Gear Operators	Refer to <i>Selection Chart</i> on Page 5
Recommended Actuators	Pneumatic D-3153-51xx D-3244-51xx D-3246-51xx V-9000 Series
	Electric VA-9000 Series VA-9070 Series

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	Electric VA-9000 Series VA-9070 Series

VF Series Butterfly Valve Bodies, 2 Through 20 in. (Continued)

Cv Values ^(a)									
Valve Size (in.)	Disc Position (Degrees)								
	90° ^(b)	80°	70° ^(c)	60°	50°	40°	30°	20°	10°
2	144	114	84	61	43	27	16	7	1
2-1/2	282	223	163	107	67	43	24	11	1.5
3	461	364	267	154	96	61	35	15	2
4	841	701	496	274	171	109	62	27	3
5	1,376	1,146	775	428	268	170	98	43	5
6	1,850	1,542	1,025	567	354	225	129	56	6
8	3,316	2,842	1,862	1,081	680	421	241	102	12
10	5,430	4,525	2,948	1,710	1,076	667	382	162	19
12	8,077	6,731	4,393	2,563	1,594	1,005	555	235	27
14	10,538	8,874	5,939	3,384	2,149	1,320	756	299	34
16	13,966	11,761	7,867	4,483	2,847	1,749	1,001	397	45
18	17,214	14,496	10,065	5,736	3,643	2,237	1,281	507	58
20	22,339	18,812	12,535	7,144	4,536	2,786	1,595	632	72

(a) $Cv \times 0.857 = Kv$

(b) Maximum stroke for all other valves.

(c) Maximum stroke for valves with pneumatic piston actuators.

Note: Recommended control angles are between 25° to 70° open. Preferred angle for control valve sizing is 60° to 65° open.

Two-Way Valves Expected Seating/Unseating Torques (lb-in.) ^(a)					
Valve Size (in.)	High Pressure Valves Pressure Drop (psi) ^(b)				Low Pressure Valves Pressure Drop (psi) ^(b)
	50	100	150	175	50
2	121	123	125	126	—
2-1/2	140	144	148	150	—
3	163	170	177	180	—
4	345	356	367	372	180
5	430	445	460	468	312
6	526	541	556	564	456
8	1,099	1,149	1,199	1,224	564
10	2,037	2,291	2,546	2,637	1,128
12	3,110	3,519	3,928	4,132	2,074
14	4,500	5,182	5,864	—	3,000
16	5,819	7,000	8,182	—	3,880
18	7,182	9,000	10,819	—	4,788
20	9,364	11,728	14,091	—	6,243

(a) 1 lb-in. x 113 = mN·m

(b) psig x 7 = kPa

Note: For three-way valves, multiply the above values by 1.2 (the above values do not include a safety factor).

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6	1,850	1,542	1,025	567	354	225	129	56	6
8	3,316	2,842	1,862	1,081	680	421	241	102	12
10	5,430	4,525	2,948	1,710	1,076	667	382	162	19
12	8,077	6,731	4,393	2,563	1,594	1,005	555	235	27
14	10,538	8,874	5,939	3,384	2,149	1,320	756	299	34
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2	121	123	125	126	—
2-1/2	140	144	148	150	—
3	163	170	177	180	—
4	345	356	367	372	180
5	430	445	460	468	312
6	526	541	556	564	456
8	1,099	1,149	1,199	1,224	564
10	2,037	2,291	2,546	2,637	1,128
12	3,110	3,519	3,928	4,132	2,074
14	4,500	5,182	5,864	—	3,000
16	5,819	7,000	8,182	—	3,880
18	7,182	9,000	10,819	—	4,788
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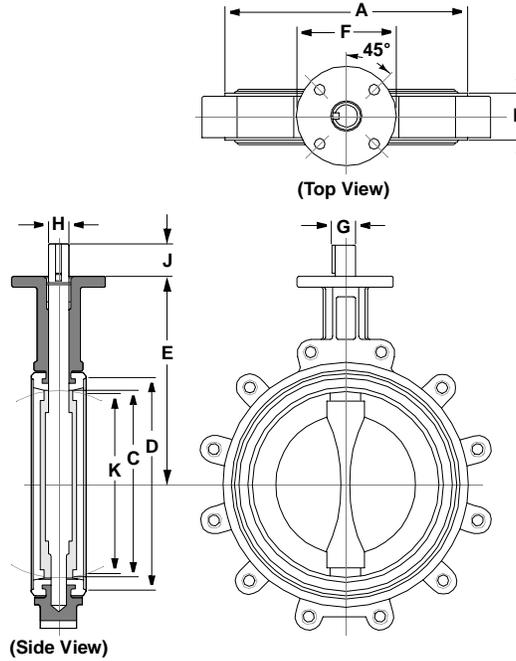
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(b) psig x 7 = kPa

Note: For three-way valves, multiply the above values by 1.2 (the above values do not include a safety factor).

VF Series Butterfly Valve Bodies, 2 Through 20 in. (Continued)

Two-Way Butterfly Valve Dimensions (in.)*



Valve Size (in.)	A	B	C	D	E	F	Actuator Mounting Flange Drilling				G	H	J	K ^(a)	Lug Bolting Data		
							Bolt Circle	Hub Size (b)	No. Holes	Hole Dia.					Bolt Circle	No. Holes	Threads UNC-2B
2	3-11/16	1-5/8	2	2-27/32	5-1/2	3-17/32	2-3/4	A	4	3/8	9/16	13/32	1-1/4	1-11/32	4-3/4	4	5/8-11
2-1/2	4-3/16	1-3/4	2-1/2	3-11/32	6	3-17/32	2-3/4	A	4	3/8	9/16	13/32	1-1/4	1-15/16	5-12	4	5/8-11
3	4-7/8	1-3/4	3	4-1/32	6-1/4	3-17/32	2-3/4	A	4	3/8	9/16	13/32	1-1/4	2-9/16	6	4	5/8-11
4	6-1/6	2	4	5-5/32	7	3-17/32	2-3/4	A	4	3/8	5/8	7/16	1-1/4	3-19/32	7-1/2	8	5/8-11
5	7-1/8	2-1/8	5	6-5/32	7-1/2	3-17/32	2-3/4	A	4	3/8	3/4	17/32	1-1/4	4-21/32	8-1/2	8	3/4-10
6	8-1/8	2-1/8	5-3/4	7	8	3-17/32	2-3/4	A	4	3/8	3/4	17/32	1-1/4	5-15/32	9-1/2	8	3/4-10
8	10-1/2	2-1/2	7-3/4	9-15/32	9-1/2	5-29/32	4-29/32	B	4	9/16	7/8	5/8	1-1/4	7-15/32	11-3/4	8	3/4-10
10	12-3/4	2-1/2	9-3/4	11-15/32	10-3/4	5-29/32	4-29/32	B	4	9/16	1-3/16	7/8	2	9-17/32	14-1/4	12	7/8-9
12	14-7/8	3	11-3/4	13-15/32	12-1/4	5-29/32	4-29/32	B	4	9/16	1-3/16	7/8	2	11-15/32	17	12	7/8-9
14	16-15/16	3	13-1/4	15-9/32	13-5/8	5-29/32	4-29/32	B	4	9/16	1-3/8	—	2	13-1/16	18-3/4	12	1-8
16	19-1/16	4	15-1/4	17-5/32	14-3/4	5-29/32	4-29/32	B	4	9/16	1-3/8	—	2	14-27/32	21-1/4	16	1-8
18	21-1/8	4-1/4	17-1/4	19-15/32	16	8-9/32	6-1/2	C	4	13/16	1-31/32	—	2-1/2	16-27/32	22-3/4	16	1-1/8-7
20	23-1/4	5	19-1/4	21-19/32	17-1/4	8-9/32	6-1/2	C	4	13/16	1-31/32	—	2-1/2	18-3/4	25	20	1-1/8-7

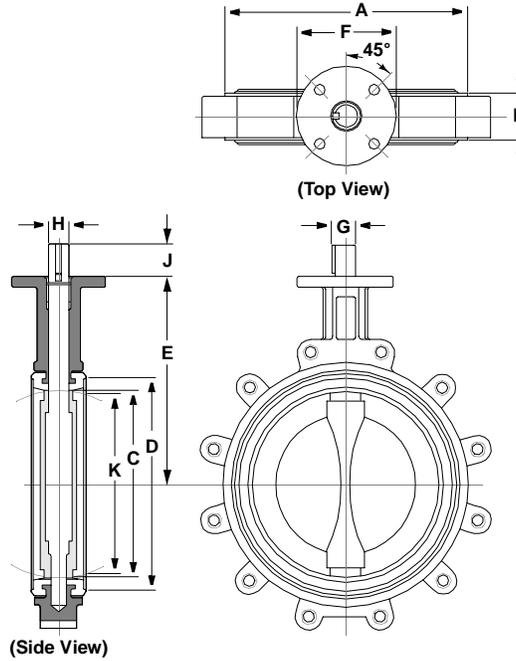
(a) Disc chordal dimension at valve face.

(b) This designation is not a dimension. It is used in electric actuator code number selection when an electric actuator is ordered separately.

* Inches x 25.4 = mm

VF Series Butterfly Valve Bodies, 2 Through 20 in. (Continued)

Two-Way Butterfly Valve Dimensions (in.)*



Valve Size (in.)	A	B	C	D	E	F	Actuator Mounting Flange Drilling				G	H	J	K ^(a)	Lug Bolting Data		
							Bolt Circle	Hub Size (b)	No. Holes	Hole Dia.					Bolt Circle	No. Holes	Threads UNC-2B
2	3-11/16	1-5/8	2	2-27/32	5-1/2	3-17/32	2-3/4	A	4	3/8	9/16	13/32	1-1/4	1-11/32	4-3/4	4	5/8-11
2-1/2	4-3/16	1-3/4	2-1/2	3-11/32	6	3-17/32	2-3/4	A	4	3/8	9/16	13/32	1-1/4	1-15/16	5-12	4	5/8-11
3	4-7/8	1-3/4	3	4-1/32	6-1/4	3-17/32	2-3/4	A	4	3/8	9/16	13/32	1-1/4	2-9/16	6	4	5/8-11
4	6-1/6	2	4	5-5/32	7	3-17/32	2-3/4	A	4	3/8	5/8	7/16	1-1/4	3-19/32	7-1/2	8	5/8-11
5	7-1/8	2-1/8	5	6-5/32	7-1/2	3-17/32	2-3/4	A	4	3/8	3/4	17/32	1-1/4	4-21/32	8-1/2	8	3/4-10
6	8-1/8	2-1/8	5-3/4	7	8	3-17/32	2-3/4	A	4	3/8	3/4	17/32	1-1/4	5-15/32	9-1/2	8	3/4-10
8	10-1/2	2-1/2	7-3/4	9-15/32	9-1/2	5-29/32	4-29/32	B	4	9/16	7/8	5/8	1-1/4	7-15/32	11-3/4	8	3/4-10
10	12-3/4	2-1/2	9-3/4	11-15/32	10-3/4	5-29/32	4-29/32	B	4	9/16	1-3/16	7/8	2	9-17/32	14-1/4	12	7/8-9
12	14-7/8	3	11-3/4	13-15/32	12-1/4	5-29/32	4-29/32	B	4	9/16	1-3/16	7/8	2	11-15/32	17	12	7/8-9
14	16-15/16	3	13-1/4	15-9/32	13-5/8	5-29/32	4-29/32	B	4	9/16	1-3/8	—	2	13-1/16	18-3/4	12	1-8
16	19-1/16	4	15-1/4	17-5/32	14-3/4	5-29/32	4-29/32	B	4	9/16	1-3/8	—	2	14-27/32	21-1/4	16	1-8
18	21-1/8	4-1/4	17-1/4	19-15/32	16	8-9/32	6-1/2	C	4	13/16	1-31/32	—	2-1/2	16-27/32	22-3/4	16	1-1/8-7
20	23-1/4	5	19-1/4	21-19/32	17-1/4	8-9/32	6-1/2	C	4	13/16	1-31/32	—	2-1/2	18-3/4	25	20	1-1/8-7

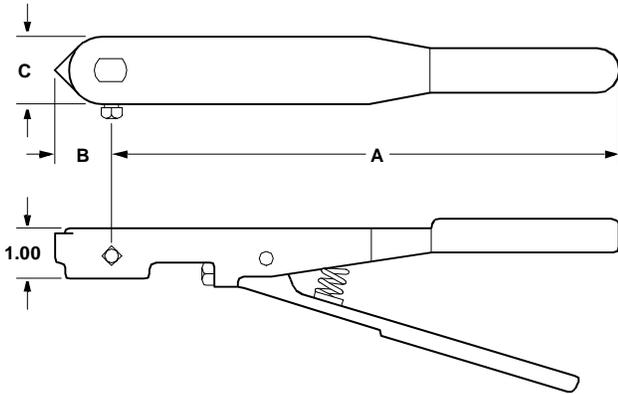
(a) Disc chordal dimension at valve face.

(b) This designation is not a dimension. It is used in electric actuator code number selection when an electric actuator is ordered separately.

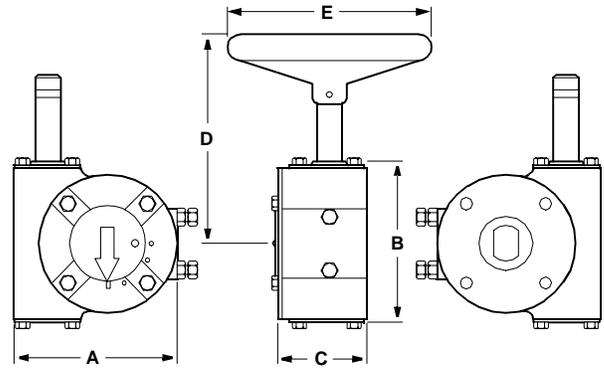
* Inches x 25.4 = mm

VF Series Butterfly Valve Bodies, 2 Through 20 in. (Continued)

Accessories VF Series Butterfly Valves, 2 Through 20 in., Two-Way



Manual Handle Operator (in.)



Manual Gear Operator

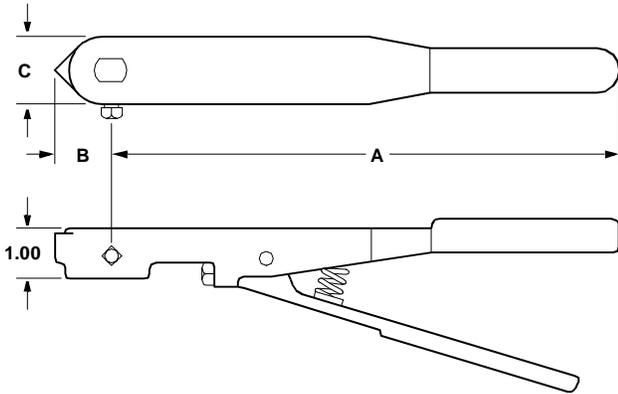
Accessories

Code Number	Description	Dimensions, in.				
Manual Handle Operator Kits:						
	Valve Size (in.)	A	B	C		
VF-999-101	2 and 3	10.62	1.12	1.38		
VF-999-102	4	10.62	1.12	1.38		
VF-999-103	5 and 6	10.62	1.12	1.38		
VF-999-104	8	11.75	1.62	2.00		
VF-999-105	10 and 12	11.75	1.62	2.00		
Manual Gear Operator Kits:						
	Valve Size (in.)	A	B	C	D	E
VF-999-201	2 to 6	4.55	4.44	2.67	5.34	8
VF-999-202	8 and 10	4.20	6.03	2.59	7.22	8
VF-999-203	12	6.91	6.56	3.27	8.66	8
VF-999-204	14	6.91	6.56	3.27	8.66	8
VF-999-205	16	7.91	6.72	3.42	8.81	12
VF-999-206	18 and 20	11.25	9.59	4.33	10.83	12

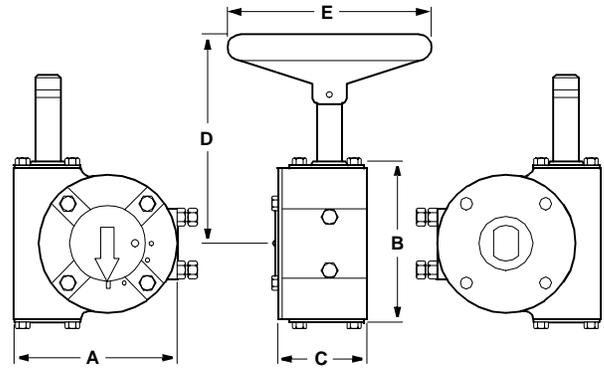
Note: Order VFM-xxxx-000N and select either a manual lever (or handle) or gear operator for manual operation.

VF Series Butterfly Valve Bodies, 2 Through 20 in. (Continued)

Accessories VF Series Butterfly Valves, 2 Through 20 in., Two-Way



Manual Handle Operator (in.)



Manual Gear Operator

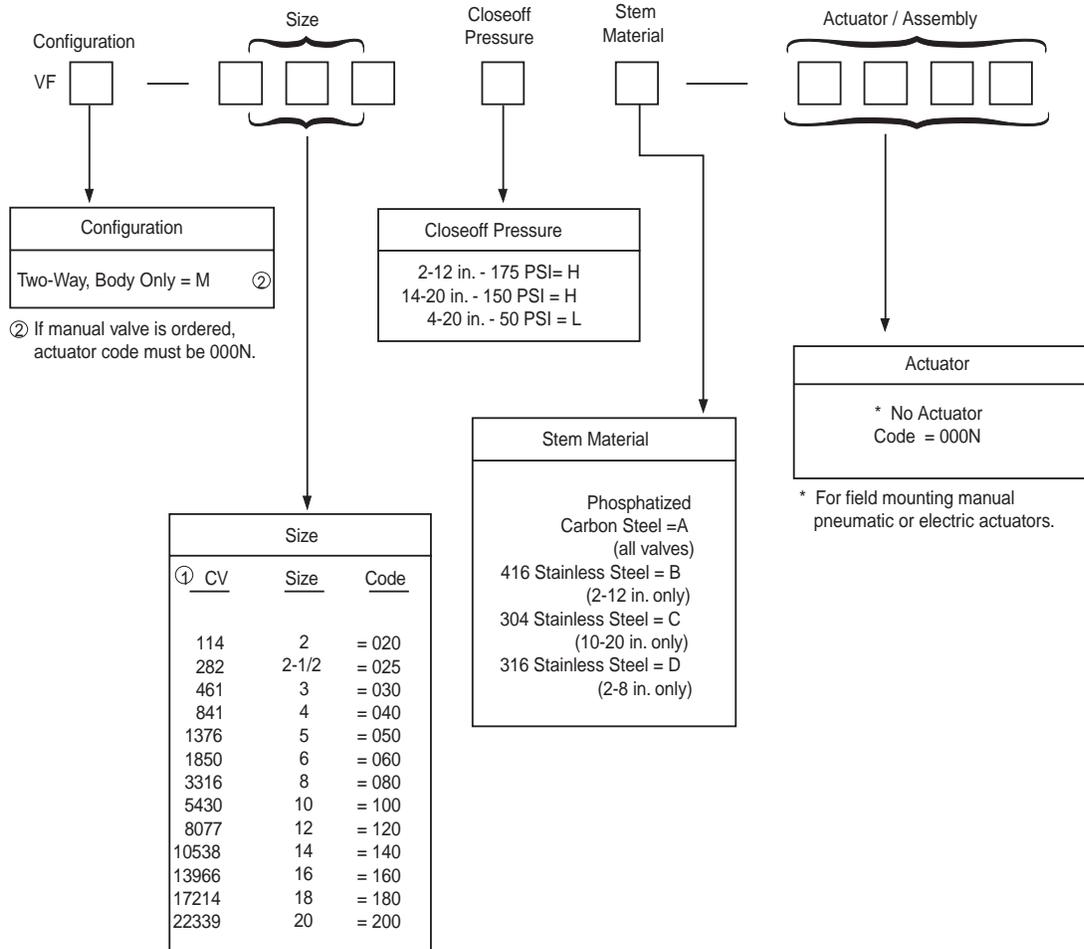
Accessories

Code Number	Description	Dimensions, in.				
Manual Handle Operator Kits:						
	Valve Size (in.)	A	B	C		
VF-999-101	2 and 3	10.62	1.12	1.38		
VF-999-102	4	10.62	1.12	1.38		
VF-999-103	5 and 6	10.62	1.12	1.38		
VF-999-104	8	11.75	1.62	2.00		
VF-999-105	10 and 12	11.75	1.62	2.00		
Manual Gear Operator Kits:						
	Valve Size (in.)	A	B	C	D	E
VF-999-201	2 to 6	4.55	4.44	2.67	5.34	8
VF-999-202	8 and 10	4.20	6.03	2.59	7.22	8
VF-999-203	12	6.91	6.56	3.27	8.66	8
VF-999-204	14	6.91	6.56	3.27	8.66	8
VF-999-205	16	7.91	6.72	3.42	8.81	12
VF-999-206	18 and 20	11.25	9.59	4.33	10.83	12

Note: Order VFM-xxxx-000N and select either a manual lever (or handle) or gear operator for manual operation.

VF Series Butterfly Valve Bodies, 2 Through 20 in. (Continued)

Selection Chart



① Based on 90 degree full rotation

Example: To order a 6 in., two-way, low closeoff pressure (50 psi) butterfly valve featuring a phosphatized carbon steel stem with no actuator, use code number VFM-060LA-000N.