

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are specifically designed for a wide range of HVAC applications, including two-position and modulating control of hot water, condenser water, or chilled water. All valves are factory tested for bubble-tight shutoff at 100% of the fully-rated pressure. These valves are bidirectional, allowing positive shutoff with the flow in either direction.

Two-way configurations are available in sizes from 2 through 20 in. Three-way assemblies have two valves that are linked together and mounted on a flanged, cast-iron tee. Three-way configurations are available in sizes from 2 through 12 in. Standard pressure valve ratings available include 175 psig for 2 through 12 in. valves, 150 psig for 14 through 20 in. valves, and 50 psig for 4 through 20 in. valves.

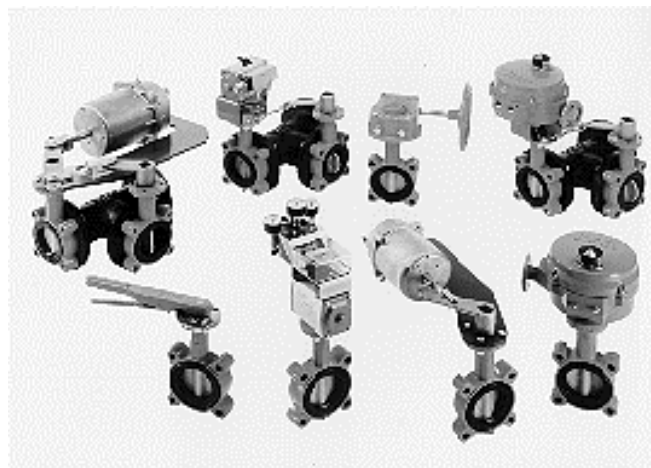


Figure 1: VF Series Standard-Pressure, Standard-Temperature Butterfly Valves

Features and Benefits	
<input type="checkbox"/> Low Seating/Unseating Torques	Reduces actuator torque and size requirements, particularly with lower-pressure rated valves
<input type="checkbox"/> Bubble-Tight Shutoff	Ensures positive closure when needed
<input type="checkbox"/> Broad Range of Pre-Assembled Actuators	Offers a wide selection for new and replacement electric and pneumatic actuators
<input type="checkbox"/> Compatible with All Types of ANSI 125/150 Slip-On and Weld-Neck Flanges	Enables field configuration with readily available standard fittings
<input type="checkbox"/> High-Integrity Components	Provides quality valve assemblies, combining long cycle life with optimal engineered functional designs

Table 1: Ordering Data

V	F															
1	2	Butterfly Valve														
	C											Body Type	N = Two-Way, Normally Open (N.O.) C = Two-Way, Normally Closed (N.C.) M = Two-Way, Manually Operated D = Three-Way, Style "D" E = Three-Way, Style "E" F = Three-Way, Style "F" G = Three-Way, Style "G"			
	3															
		-	1	0	0							Valve Size	020 = 2 in. 025 = 2-1/2 in. 030 = 3 in. 040 = 4 in. 050 = 5 in. 060 = 6 in. 080 = 8 in. 100 = 10 in. 120 = 12 in. 140 = 14 in. 160 = 16 in. 180 = 18 in. 200 = 20 in.			
		4	5	6	7											
						H						Closeoff	H = High Pressure Closeoff (175 psig 2 through 12 in.; 150 psig 14 through 20 in.) L = Low Pressure Closeoff (50 psig)			
						8										
							B					Stem Material	B = 416 Stainless Steel (2 through 12 in.) C = 304 Stainless Steel (14 through 20 in.)			
							9									
								-	7	0	6			Actuator	Refer to Table 2.	
								10	11	12	13					
												N	Accessories			A = Low Pressure Positioner B = High Pressure Positioner C = 120 VAC Solenoid with Speed Controls D = Thermostat/Heater Kit for On/Off Electric Actuators E = 24 VAC Solenoid with Speed Controls G = Gear-Operated Manual Hand Wheel M = Ten-Position Manual Handle N = None (Thermostat/Heater Kit for Proportional Electric Actuators)
												14				

1 2 3 4 5 6 7 8 9 10 11 12 13 14 = Field

V	F	C	-	1	0	0	H	B	-	7	0	6	N
<i>Butterfly Valve Assembly</i>													

Example: Two-way normally closed valve, 10 in., high pressure closeoff, with 416 stainless steel stem, proportional electric actuator, and thermostat/heater kit.

Table 2: Ordering Data – Adding Factory-Mounted Pneumatic or Electric Actuator

Refer to Tables 3 through 11 for valid factory assemblies.	
<p>Low Pressure Pneumatic, Spring-Return</p> <p>001 = D-3153 002 = D-3244 003 = D-3246 005 = D-3246 (Tandem Mounted)</p>	<p>High Pressure Pneumatic, Spring Return</p> <p>320 = V-9193-12 330 = V-9193-13 340 = V-9193-14</p>
<p>High Pressure Pneumatic, Non-Spring Return</p> <p>020 = V-9092-1 030 = V-9093-1 040 = V-9094-1 042 = V-9094-2 050 = V-9095-1 060 = V-9096-1 070 = V-9097-1 080 = V-9098-1</p>	<p>422 = V-9194-22 432 = V-9194-23 440 = V-9194-14 442 = V-9194-24 450 = V-9194-15</p> <p>530 = V-9195-13 550 = V-9195-15</p>
<p>Electric, Proportional, Non-Spring Return</p> <p>701 = VA-9071-01 702 = VA-9072-01 703 = VA-9073-01 704 = VA-9074-01 705 = VA-9075-01 706 = VA-9076-01 707 = VA-9077-01 708 = VA-9078-01</p> <p>907 = VA-9007-01 908 = VA-9008-01</p>	<p>620 = V-9196-12 630 = V-9196-13 640 = V-9196-14 660 = V-9196-16</p> <p>720 = V-9197-12 730 = V-9197-13 740 = V-9197-14 750 = V-9197-15 760 = V-9197-16</p> <p>820 = V-9198-12 830 = V-9198-13 840 = V-9198-14 850 = V-9198-15 860 = V-9198-16</p>
<p>Electric, On/Off, Non-Spring Return</p> <p>721 = VA-9071-02 722 = VA-9072-02 723 = VA-9073-02 724 = VA-9074-02 725 = VA-9075-02 726 = VA-9076-02 727 = VA-9077-02 728 = VA-9078-02</p> <p>927 = VA-9007-02 928 = VA-9008-02</p>	<p>Manual Operator</p> <p>000 = Valve Less Actuator (Refer to the <i>Optional Valve Accessories</i> section to add a ten-position manual handle or a gear-operated manual hand wheel in the field; refer to Table 1 for available factory-mounted options.)</p>



Figure 2: Two-Way Valve with Spring Return, D-3000 Series Low Pressure Pneumatic Actuator

Table 3: Two-Way Valves with Spring Return, D-3000 Series Low Pressure Pneumatic Actuators

Actuator			On/Off		Proportional (With Positioner)	
Size, in.	Cv at 70 Degrees	Closeoff Pressure, psig	Spring Closed	Spring Open	Spring Closed	Spring Open
Two-Way, Normally Closed – 175 psig Closeoff Pressure; 75 psig Dead-End Service						
2	84	175	VFC-020HB-001N	VFN-020HB-001N	VFC-020HB-001A	VFN-020HB-001A
2-1/2	163	175	VFC-025HB-001N	VFN-025HB-001N	VFC-025HB-001A	VFN-025HB-001A
3	267	175	VFC-030HB-001N	VFN-030HB-001N	VFC-030HB-001A	VFN-030HB-001A
4	496	175	VFC-040HB-002N	VFN-040HB-002N	VFC-040HB-002A	VFN-040HB-002A
5	775	175	VFC-050HB-003N	VFN-050HB-003N	VFC-050HB-003A	VFN-050HB-003A
6	1,025	175	VFC-060HB-003N	VFN-060HB-003N	VFC-060HB-003A	VFN-060HB-003A
8	1,862	175	VFC-080HB-005N*	VFN-080HB-005N*	VFC-080HB-005A*	VFN-080HB-005A*
Two-Way, Normally Closed – 50 psig Closeoff Pressure; Not Rated for Dead-End Service						
4	496	50	VFC-040LB-001N	VFN-040LB-001N	VFC-040LB-001A	VFN-040LB-001A
5	775	50	VFC-050LB-002N	VFN-050LB-002N	VFC-050LB-002A	VFN-050LB-002A
6	1,025	50	VFC-060LB-003N	VFN-060LB-003N	VFC-060LB-003A	VFN-060LB-003A
8	1,862	50	VFC-080LB-003N	VFN-080LB-003N	VFC-080LB-003A	VFN-080LB-003A
10	2,948	50	VFC-100LB-005N*	VFN-100LB-005N*	VFC-100LB-005A*	VFN-100LB-005A*

* Valve assemblies have two actuators mounted in tandem.



Figure 3: Three-Way Valve with Spring Return, D-3000 Series Low Pressure Pneumatic Actuator

Table 4: Three-Way Valves with Spring Return, D-3000 Series Low Pressure Pneumatic Actuators

Actuator			On/Off	Proportional (With Positioner)
Size, in.	Cv at 70 Degrees	Closeoff Pressure, psig		
Three-Way* – 175 psig Closeoff Pressure – 75 psig Dead-End Service				
2	84	175	VFD-020HB-001N	VFD-020HB-001A
2-1/2	163	175	VFD-025HB-002N	VFD-025HB-002A
3	267	175	VFD-030HB-002N	VFD-030HB-002A
4	496	175	VFD-040HB-003N	VFD-040HB-003A
5	775	175	VFD-050HB-003N	VFD-050HB-003A
6	1,025	175	VFD-060HB-005N**	VFD-060HB-005A**
Three-Way* – 50 psig Closeoff Pressure; Not Rated for Dead-End Service				
4	496	50	VFD-040LB-002N	VFD-040LB-002A
5	775	50	VFD-050LB-003N	VFD-050LB-003A
6	1,025	50	VFD-060LB-003N	VFD-060LB-003A
8	1,862	50	VFD-080LB-005N**	VFD-080LB-005A**

* Code numbers listed are three-way valves, style “D”. For styles “E”, “F”, or “G” change the “D” in the third digit of the code number to the desired style. Example: VFE-xxxx-xxxx, VFF-xxxx-xxxx, VFG-xxxx-xxxx (see Figure 4).

** Valve assemblies have two actuators mounted in tandem.

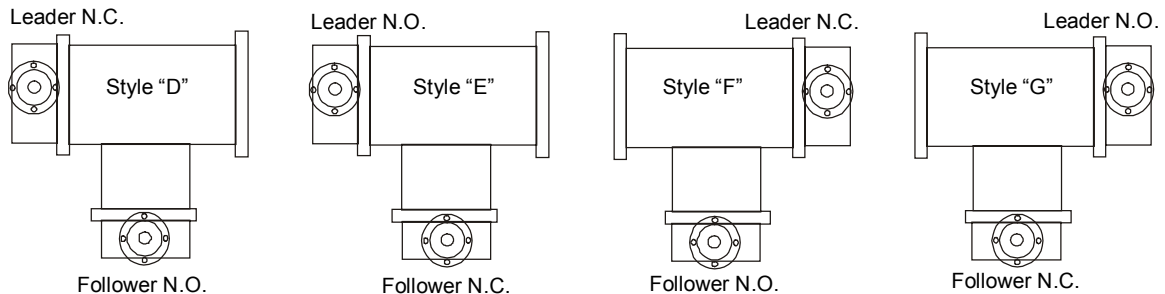


Figure 4: Three-Way Valve Body Styles



Figure 5: Two-Way Valve with Industrial-Grade, Non-Spring Return, VA-90xx Series Electric Actuator

Table 5: Two-Way Valves with Industrial-Grade, Non-Spring Return, VA-90xx Series Electric Actuators

Actuator				On/Off	0 to 10 VDC Proportional
Size, in.	Cv at 90 Degrees	Cv at 60 Degrees	Closeoff Pressure, psig		
Two-Way, Non-Spring Return – 150 or 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	VFC-020HB-721D	VFC-020HB-701N
2-1/2	282	107	175	VFC-025HB-721D	VFC-025HB-701N
3	461	154	175	VFC-030HB-721D	VFC-030HB-701N
4	841	274	175	VFC-040HB-722D	VFC-040HB-702N
5	1,376	428	175	VFC-050HB-723D	VFC-050HB-703N
6	1,850	567	175	VFC-060HB-723D	VFC-060HB-703N
8	3,316	1,081	175	VFC-080HB-725D	VFC-080HB-705N
10	5,430	1,710	175	VFC-100HB-726D	VFC-100HB-706N
12	8,077	2,563	175	VFC-120HB-727D	VFC-120HB-707N
14	10,538	3,384	150	VFC-140HC-728D	VFC-140HC-708N
16	13,966	4,483	150	VFC-160HC-927D	VFC-160HC-907N
18	17,214	5,736	150	VFC-180HC-928D	VFC-180HC-908N
20	22,339	7,144	150	VFC-200HC-928D	VFC-200HC-908N
Two-Way, Non-Spring Return – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	VFC-040LB-721D	VFC-040LB-701N
5	1,376	428	50	VFC-050LB-722D	VFC-050LB-702N
6	1,850	567	50	VFC-060LB-722D	VFC-060LB-702N
8	3,316	1,081	50	VFC-080LB-723D	VFC-080LB-703N
10	5,430	1,710	50	VFC-100LB-725D	VFC-100LB-705N
12	8,077	2,563	50	VFC-120LB-726D	VFC-120LB-706N
14	10,538	3,384	50	VFC-140LC-727D	VFC-140LC-707N
16	13,966	4,483	50	VFC-160LC-727D	VFC-160LC-707N
18	17,214	5,736	50	VFC-180LC-728D	VFC-180LC-708N
20	22,339	7,144	50	VFC-200LC-728D	VFC-200LC-708N



Figure 6: Three-Way Valve with Industrial-Grade, Non-Spring Return, VA-907x Series Electric Actuator

Table 6: Three-Way Valves with Industrial-Grade, Non-Spring Return, VA-907x Series Electric Actuators

Actuator				On/Off	0 to 10 VDC Proportional
Size, in.	Cv at 90 Degrees	Cv at 60 Degrees	Closeoff Pressure, psig		
Three-Way, Non-Spring Return* – 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	VFD-020HB-721D	VFD-020HB-701N
2-1/2	282	107	175	VFD-025HB-721D	VFD-025HB-701N
3	461	154	175	VFD-030HB-721D	VFD-030HB-701N
4	841	274	175	VFD-040HB-723D	VFD-040HB-703N
5	1,376	428	175	VFD-050HB-723D	VFD-050HB-703N
6	1,850	567	175	VFD-060HB-724D	VFD-060HB-704N
8	3,316	1,081	175	VFD-080HB-725D	VFD-080HB-705N
10	5,430	1,710	175	VFD-100HB-727D	VFD-100HB-707N
12	8,077	2,563	175	VFD-120HB-728D	VFD-120HB-708N
Three-Way, Non-Spring Return* – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	VFD-040LB-721D	VFD-040LB-701N
5	1,376	428	50	VFD-050LB-722D	VFD-050LB-702N
6	1,850	567	50	VFD-060LB-723D	VFD-060LB-703N
8	3,316	1,081	50	VFD-080LB-724D	VFD-080LB-704N
10	5,430	1,710	50	VFD-100LB-725D	VFD-100LB-705N
12	8,077	2,563	50	VFD-120LB-727D	VFD-120LB-707N

* Code numbers listed are three-way valves, style “D”. For styles “E”, “F”, or “G” change the “D” in the third digit of the code number to the desired style. Example: VFE-xxxxx-xxxx, VFF-xxxxx-xxxx, VFG-xxxxx-xxxx (see Figure 4).



Figure 7: Two-Way Valve with Industrial-Grade, Spring Return, V-919x Series High Pressure Pneumatic Actuator

Table 7: Two-Way Valves with Industrial Grade, Spring Return, V-919x Series High Pressure Pneumatic Actuators

Actuator				On/Off*		Proportional (With Positioner)	
Size, in.	Cv at 90 Degrees	Cv at 60 Degrees	Closeoff Pressure, psig	Spring Closed	Spring Open	Spring Closed	Spring Open
Two-Way, Spring Return* – 150 or 175 psig Closeoff Pressure; 75 psig Dead-End Service							
2	144	61	175	VFC-020HB-320C	VFN-020HB-320C	VFC-020HB-320B	VFN-020HB-320B
2-1/2	282	107	175	VFC-025HB-330C	VFN-025HB-320C	VFC-025HB-330B	VFN-025HB-320B
3	461	154	175	VFC-030HB-340C	VFN-030HB-330C	VFC-030HB-340B	VFN-030HB-330B
4	841	274	175	VFC-040HB-450C	VFN-040HB-440C	VFC-040HB-450B	VFN-040HB-440B
5	1,376	428	175	VFC-050HB-432C	VFN-050HB-422C	VFC-050HB-432B	VFN-050HB-422B
6	1,850	567	175	VFC-060HB-442C	VFN-060HB-432C	VFC-060HB-442B	VFN-060HB-432B
8	3,316	1,081	175	VFC-080HB-640C	VFN-080HB-620C	VFC-080HB-640B	VFN-080HB-620B
10	5,430	1,710	175	VFC-100HB-740C	VFN-100HB-720C	VFC-100HB-740B	VFN-100HB-720B
12	8,077	2,563	175	VFC-120HB-750C	VFN-120HB-730C	VFC-120HB-750B	VFN-120HB-730B
14	10,538	3,384	150	VFC-140HC-760C	VFN-140HC-820C	VFC-140HC-760B	VFN-140HC-820B
16	13,966	4,483	150	VFC-160HC-840C	VFN-160HC-830C	VFC-160HC-840B	VFN-160HC-830B
18	17,214	5,736	150	VFC-180HC-850C	VFN-180HC-830C	VFC-180HC-850B	VFN-180HC-830B
20	22,339	7,144	150	VFC-200HC-860C	VFN-200HC-840C	VFC-200HC-860B	VFN-200HC-840B
Two-Way, Spring Return* – 50 psig Closeoff Pressure; Not Rated for Dead-End Service							
4	841	274	50	VFC-040LB-340C	VFN-040LB-330C	VFC-040LB-340B	VFN-040LB-330B
5	1,376	428	50	VFC-050LB-440C	VFN-050LB-340C	VFC-050LB-440B	VFN-050LB-340B
6	1,850	567	50	VFC-060LB-432C	VFN-060LB-422C	VFC-060LB-432B	VFN-060LB-422B
8	3,316	1,081	50	VFC-080LB-442C	VFN-080LB-432C	VFC-080LB-442B	VFN-080LB-432B
10	5,430	1,710	50	VFC-100LB-550C	VFN-100LB-530C	VFC-100LB-550B	VFN-100LB-530B
12	8,077	2,563	50	VFC-120LB-660C	VFN-120LB-630C	VFC-120LB-660B	VFN-120LB-630B
14	10,538	3,384	50	VFC-140LC-740C	VFN-140LC-720C	VFC-140LC-740B	VFN-140LC-720B
16	13,966	4,483	50	VFC-160LC-740C	VFN-160LC-730C	VFC-160LC-740B	VFN-160LC-730B
18	17,214	5,736	50	VFC-180LC-750C	VFN-180LC-730C	VFC-180LC-750B	VFN-180LC-730B
20	22,339	7,144	50	VFC-200LC-830C	VFN-200LC-820C	VFC-200LC-830B	VFN-200LC-820B

* On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the “C” at the end of the code number to an “E”.



Figure 8: Three-Way Valve with Industrial-Grade, Spring Return, V-919x Series High Pressure Pneumatic Actuator

Table 8: Three-Way Valves with Industrial-Grade, Spring Return, V-919x Series High Pressure Pneumatic Actuators

Actuator				On/Off*	Proportional (With Positioner)
Size, in.	Cv at 90 Degrees	Cv at 60 Degrees	Closeoff Pressure, psig		
Three-Way, Spring Return** – 175 psig Closeoff Pressure; 75 Psig Dead-End Service					
2	144	61	175	VFD-020HB-330C	VFD-020HB-330B
2-1/2	282	107	175	VFD-025HB-340C	VFD-025HB-340B
3	461	154	175	VFD-030HB-340C	VFD-030HB-340B
4	841	274	175	VFD-040HB-432C	VFD-040HB-432B
5	1,376	428	175	VFD-050HB-442C	VFD-050HB-442B
6	1,850	567	175	VFD-060HB-530C	VFD-060HB-530B
8	3,316	1,081	175	VFD-080HB-640C	VFD-080HB-640B
10	5,430	1,710	175	VFD-100HB-740C	VFD-100HB-740B
12	8,077	2,563	175	VFD-120HB-830C	VFD-120HB-830B
Three-Way, Spring Return** – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	VFD-040LB-340C	VFD-040LB-340B
5	1,376	428	50	VFD-050LB-432C	VFD-050LB-432B
6	1,850	567	50	VFD-060LB-442C	VFD-060LB-442B
8	3,316	1,081	50	VFD-080LB-530C	VFD-080LB-530B
10	5,430	1,710	50	VFD-100LB-640C	VFD-100LB-640B
12	8,077	2,563	50	VFD-120LB-740C	VFD-120LB-740B

* On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the “C” at the end of the code number to an “E”.

** Code numbers listed are three-way valves, style “D”. For styles “E”, “F”, or “G” change the “D” in the third digit of the code number to the desired style. Example: VFE-xxxx-xxxx, VFF-xxxx-xxxx, VFG-xxxx-xxxx (see Figure 4).



Figure 9: Two-Way Valve with Industrial-Grade, Non-Spring Return, V-909x Series High Pressure Pneumatic Actuator

Table 9: Two-Way Valves with Industrial-Grade, Non-Spring Return, V-909x Series High Pressure Pneumatic Actuators

Size, in.	Actuator			On/Off*	Proportional (With Positioner)
	Cv at 90 Degrees	Cv at 60 Degrees	Closeoff Pressure, psig		
Two-Way, Non-Spring Return – 150 or 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	VFC-020HB-020C	VFC-020HB-020B
2-1/2	282	107	175	VFC-025HB-020C	VFC-025HB-020B
3	461	154	175	VFC-030HB-020C	VFC-030HB-020B
4	841	274	175	VFC-040HB-030C	VFC-040HB-030B
5	1,376	428	175	VFC-050HB-030C	VFC-050HB-030B
6	1,850	567	175	VFC-060HB-030C	VFC-060HB-030B
8	3,316	1,081	175	VFC-080HB-042C	VFC-080HB-042B
10	5,430	1,710	175	VFC-100HB-060C	VFC-100HB-060B
12	8,077	2,563	175	VFC-120HB-060C	VFC-120HB-060B
14	10,538	3,384	150	VFC-140HC-060C	VFC-140HC-060B
16	13,966	4,483	150	VFC-160HC-070C	VFC-160HC-070B
18	17,214	5,736	150	VFC-180HC-070C	VFC-180HC-070B
20	22,339	7,144	150	VFC-200HC-080C	VFC-200HC-080B
Two-Way, Non-Spring Return – 50 psig Closeoff, Not Rated for Dead-End Service					
4	841	274	50	VFC-040LB-020C	VFC-040LB-020B
5	1,376	428	50	VFC-050LB-030C	VFC-050LB-030B
6	1,850	567	50	VFC-060LB-030C	VFC-060LB-030B
8	3,316	1,081	50	VFC-080LB-040C	VFC-080LB-040B
10	5,430	1,710	50	VFC-100LB-042C	VFC-100LB-042B
12	8,077	2,563	50	VFC-120LB-042C	VFC-120LB-042B
14	10,538	3,384	50	VFC-140LC-060C	VFC-140LC-060B
16	13,966	4,483	50	VFC-160LC-060C	VFC-160LC-060B
18	17,214	5,736	50	VFC-180LC-060C	VFC-180LC-060B
20	22,339	7,144	50	VFC-200LC-070C	VFC-200LC-070B

* On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the "C" at the end of the code number to an "E".



Figure 10: Three-Way Valve with Industrial-Grade, Non-Spring Return, V-909x Series High Pressure Pneumatic Actuator

Table 10: Three-Way Valves with Industrial-Grade, Non-Spring Return, V-909x Series High Pressure Pneumatic Actuators

Actuator				On/Off*	Proportional (With Positioner)
Size, in.	Cv at 90 Degrees	Cv at 60 Degrees	Closeoff Pressure, psig		
Three-Way, Non-Spring Return** – 175 psig Closeoff Pressure, 75 psig Dead-End Service					
2	144	61	175	VFD-020HB-020C	VFD-020HB-020B
2-1/2	282	107	175	VFD-025HB-020C	VFD-025HB-020B
3	461	154	175	VFD-030HB-020C	VFD-030HB-020B
4	841	274	175	VFD-040HB-030C	VFD-040HB-030B
5	1,376	428	175	VFD-050HB-030C	VFD-050HB-030B
6	1,850	567	175	VFD-060HB-040C	VFD-060HB-040B
8	3,316	1,081	175	VFD-080HB-042C	VFD-080HB-042B
10	5,430	1,710	175	VFD-100HB-060C	VFD-100HB-060B
12	8,077	2,563	175	VFD-120HB-060C	VFD-120HB-060B
Three-Way, Non-Spring Return** – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	VFD-040LB-030C	VFD-040LB-030B
5	1,376	428	50	VFD-050LB-030C	VFD-050LB-030B
6	1,850	567	50	VFD-060LB-030C	VFD-060LB-030B
8	3,316	1,081	50	VFD-080LB-042C	VFD-080LB-042B
10	5,430	1,710	50	VFD-100LB-042C	VFD-100LB-042B
12	8,077	2,563	50	VFD-120LB-060C	VFD-120LB-060B

* On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the “C” at the end of the code number to an “E”.

** Code numbers listed are three-way valves, style “D”. For styles “E”, “F”, or “G” change the “D” in the third digit of the code number to the desired style. Example: VFE-xxxx-xxxx, VFF-xxxx-xxxx, VFG-xxxx-xxxx (see Figure 4.).



Figure 11: Two-Way Valve with Ten-Position Manual Handle



Figure 12: Two-Way Valve with Gear-Operated Manual Hand Wheel

Table 11: Two-Way Valves with Manual Operators

Actuator				Ten-Position Manual Handle	Gear-Operated Manual Hand Wheel
Size, in.	Cv at 90 Degrees	Cv at 60 Degrees	Closeoff Pressure, psig		
Two-Way, Manually Operated – 150 or 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	VFM-020HB-000M	VFM-020HB-000G
2-1/2	282	107	175	VFM-025HB-000M	VFM-025HB-000G
3	461	154	175	VFM-030HB-000M	VFM-030HB-000G
4	841	274	175	VFM-040HB-000M	VFM-040HB-000G
5	1,376	428	175	VFM-050HB-000M	VFM-050HB-000G
6	1,850	567	175	VFM-060HB-000M	VFM-060HB-000G
8	3,316	1,081	175	---	VFM-080HB-000G
10	5,430	1,710	175	---	VFM-100HB-000G
12	8,077	2,563	175	---	VFM-120HB-000G
14	10,538	3,384	150	---	VFM-140HC-000G
16	13,966	4,483	150	---	VFM-160HC-000G
18	17,214	5,736	150	---	VFM-180HC-000G
20	22,339	7,144	150	---	VFM-200HC-000G

Application Overview

All VF Series Standard-Pressure, Standard-Temperature Valves are available with a factory-assembled and calibrated actuator, sized with a 25% safety factor (2 through 8 in. valves) and a 10% safety factor (10 through 20 in. valves) to provide years of trouble-free operation. The wide variety of actuator choices include pneumatic piston type spring return actuators, pneumatic rack and pinion style actuators (both spring return and non-spring return), and high-torque rotary electric actuators which are fully compatible with Metasys® controllers.

The valve and actuator can be provided in Normally Open (N.O.) or Normally Closed (N.C.) combinations for pneumatic two-way operation. Three-way valves are available in four mounting styles to meet all possible piping layouts.

These butterfly valves have an inherent modified equal percentage relationship between disc rotation and flow at a constant pressure drop (as illustrated in Figure 13). Rangeability values are included in Table 12.

The valve body is cast iron and meets the temperature and pressure requirements for ANSI Class 125 B16.1 Class B pipe flanges. The valve neck is extended to allow for 2 in. of insulation as well as easy access to the actuator. All valve sizes are fully lugged.

The resilient seat of VF Series Standard-Pressure, Standard-Temperature Valves is molded from Ethylene Propylene Diene Monomer (EPDM), and is secured to the valve body by means of a tongue and groove design. The tongue and groove fit permits easy seat replacement after years of service.

The disc is constructed of ductile iron, and is spherically machined, hand polished, and coated with nylon 11 to provide bubble-tight shutoff, minimum torque requirements, and longer seat life. In addition, the nylon 11 coating also resists corrosion and abrasion. The discs for 50 psig closeoff pressure valves are undercut to minimize torque requirements and are coated with white nylon. The discs on all other models are coated with gray nylon.

The stem is available in 416 stainless steel (2 through 12 in.) and 304 stainless steel (14 through 20 in.). The 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.

The flow characteristics of VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are illustrated in Figure 13. Inherent flow characteristics are modified equal percentage.

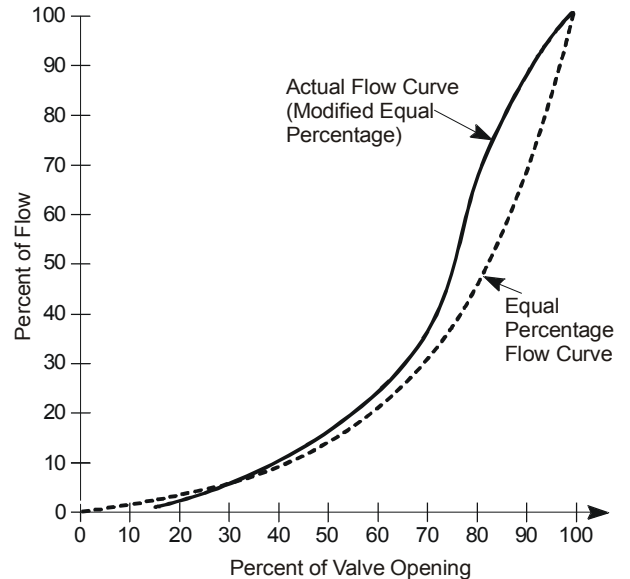


Figure 13: Modified Equal Percentage Valve Flow Characteristics

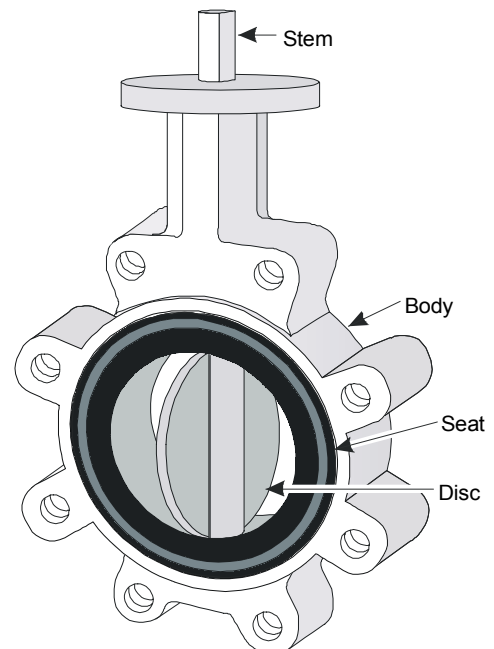


Figure 14: VF Series Standard-Pressure, Standard-Temperature Butterfly Valve

Table 12: Rangeability Values for 70° and 90° Disc Rotation

Valve Size, in.	Rangeability Values	
	70° Rotation	90° Rotation
2	18:1	31:1
2-1/2	18:1	31:1
3	19:1	33:1
4	25:1	42:1
5	32:1	57:1
6	39:1	70:1
8	67:1	119:1
10	80:1	147:1
12	92:1	163:1
14	92:1	163:1
16	92:1	163:1
18	92:1	163:1
20	92:1	163:1

Valve Actuators

All VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are available with a wide range of factory-installed pneumatic and electric actuators. Tables 3 through 11 present the actuator choices available for each valve. These valve and actuator combinations have been sized with torque safety factors to provide adequate actuator torque for years of trouble-free operation.

The D-3000 Series Pneumatic Piston Type Spring Return Actuators provide an economical and reliable means of actuation on butterfly valves in sizes up to 10 in. These actuators are sized and assembled for 70° disc rotation and require 20 psig (138 kPa) maximum input air pressure at the diaphragm to deliver their rated torque output.

The V-9000 Series Pneumatic Rack and Pinion Style Actuators (both spring return and non-spring return) are ideally suited for larger butterfly valves with torque requirements that exceed the capacity of the D-3000 Actuators, and for applications providing high air supply pressures of 40 to 120 psig (276 to 827 kPa). These actuators are sized and assembled for 90° disc rotation and are furnished with factory-installed 24 or 120 VAC solenoid valves for two-position operation. When these actuators are used for modulating operation, the solenoid valve is replaced with a positioner.

The VA-907x Series Electric Actuators are available in both two-position and modulating styles. These non-spring return, rotary motion actuators are housed in a low profile, compact die-cast aluminum NEMA 4 enclosure, and are factory calibrated for 90° disc rotation.

The VA-900x Series Electric Actuators are available in two sizes for two-position or modulating service on 150 psig 16 through 20 in. two-way butterfly valves. These non-spring return, rotary motion actuators are housed in a sturdy die-cast aluminum NEMA 4 enclosure, and are factory calibrated for 90° disc rotation.

For more detailed information on the pneumatic piston actuators, pneumatic rack and pinion actuators, or electric actuators, refer to the appropriate actuator product bulletin.

For more details on additional actuator accessories, refer to the appropriate actuator product bulletin.

Table 13: Representative Maximum Shipping Weights for VF Series Standard-Pressure, Standard-Temperature Butterfly Valve and Actuator Assemblies*

Valve Size, in.	Representative Actuator (Actuator Sub-Code)	Shipping Weight, lb (kg)
Two-Way Valve and Actuator Assemblies		
2	One D-3153 (-001)	53 (24.1)
2-1/2	One D-3153 (-001)	55 (25.0)
3	One D-3153 (-001)	56 (25.4)
4	One D-3244 (-002)	70 (31.8)
5	One D-3246 (-003)	97 (44.0)
6	One D-3246 (-003)	100 (45.4)
8	One D-3246 (-003)	132 (59.9)
10	Two D-3246s (-005)	208 (94.4)
12	One V-9198-13 (-830)	306 (138.9)
14	One V-9198-13 (-830)	337 (153.0)
16	One V-9198-14 (-840)	398 (180.7)
18	One V-9198-15 (-850)	468 (212.5)
20	One V-9198-16 (-860)	556 (252.4)
Three-Way Valve and Actuator Assemblies		
2	One D-3153 (-001)	115 (52.2)
2-1/2	One D-3244 (-002)	142 (64.5)
3	One D-3244 (-002)	151 (68.6)
4	One D-3246 (-003)	181 (82.2)
5	One D-3246 (-003)	208 (94.4)
6	Two D-3246s (-005)	278 (126.2)
8	Two D-3246s (-005)	377 (171.2)
10	One V-9198-12 (-820)	657 (298.3)
12	One V-9198-13 (-830)	808 (366.8)

* The above shipping weights are approximate, and are based on the heaviest valve, actuator, and accessory combination available for each assembly size.

Optional Valve Accessories

For manually operated actuator and valve assemblies, a ten-position manual handle or gear-operated manual hand wheel is available; refer to Tables 14 and 15 for more details.

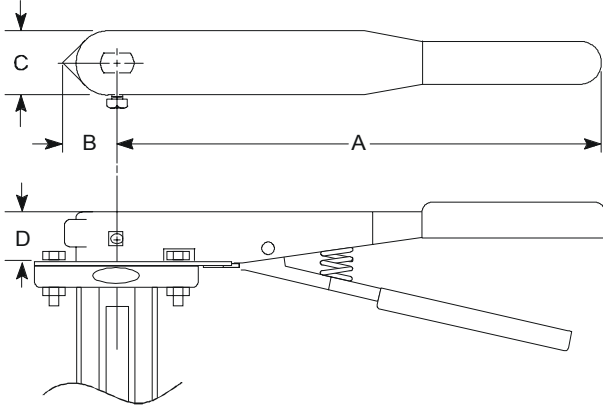


Figure 15: Dimensions for Ten-Position Manual Handle (Refer to Table 14.)

Table 14: Dimensions for Ten-Position Manual Handle, in. (mm)

Valve Size, in.	Code Number*	A	B	C	D
2 through 3	VF-999-101	10-5/8 (270)	1-1/8 (29)	1-3/8 (35)	1 (25)
4	VF-999-102				
5 and 6	VF-999-103				

* Kit includes a manual handle operator, notch plate, and mounting hardware.

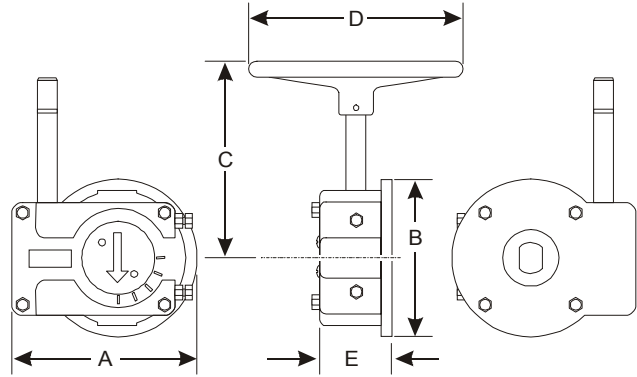


Figure 16: Dimensions for Gear-Operated Manual Hand Wheel (Refer to Table 15.)

Table 15: Dimensions for Gear-Operated Manual Hand Wheel, in. (mm)

Valve Size, in.	Code Number*	A	B	C	D	E
2 through 3	VF-999-301	4.53 (115)	3.50 (89)	5.34 (136)	8.00 (203)	2.56 (65)
4	VF-999-302	4.53 (115)	3.50 (89)	5.34 (136)	8.00 (203)	2.56 (65)
5 and 6	VF-999-303	4.53 (115)	3.50 (89)	5.34 (136)	8.00 (203)	2.56 (65)
8	VF-999-304	6.89 (175)	5.91 (150)	7.50 (191)	8.00 (203)	2.50 (64)
10 and 12	VF-999-305	6.89 (175)	5.91 (150)	7.50 (191)	8.00 (203)	2.50 (64)
14	VF-999-306	6.89 (175)	5.91 (150)	7.50 (191)	8.00 (203)	2.50 (64)
16	VF-999-307	7.53 (191)	5.91 (150)	11.81 (300)	12.00 (305)	3.28 (83)
18 and 20	VF-999-308	10.51 (267)	8.27 (210)	14.81 (376)	12.00 (305)	4.39 (112)

* Kit includes a manual gear operator, adaptor (if required), and mounting hardware.

Product Guidelines

Please be sure to read the following information carefully before installing a VF Series Standard-Pressure, Standard-Temperature Butterfly Valve Assembly:

- Make sure that the pipeline and flange faces are clean. Pipe scale, metal chips, weld slag, and weld rods can obstruct disc movement and damage the disc and seat.
- The resilient seat of the valve is equipped with molded O-rings on the face of the seat; do not use gaskets.
- The valves should be handled by the extended valve neck only. Heavier valves may require a nylon sling to be used as a hoist around the valve neck and/or cast-iron tee (on three-way assemblies). Never pick up a valve by the actuator, mounting bracket, or interconnecting linkage.
- Most VF Series Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies are shipped with the disc in the near-closed position (approximately 10° open). Valves equipped with pneumatic piston type actuators are shipped with the actuator de-coupled from the crankarm, and with the actuator and any interconnecting linkage strapped to the bracket. Do not remove the strapping until the valve is completely installed between the pipe flanges.
- Valves equipped with a V-919x series Pneumatic Rack and Pinion Spring Return Actuator require a regulated pneumatic air supply to position the disc to 10° open prior to and during installation. If no air supply is available during installation, the actuator must be removed to allow for the manual positioning of the disc to the proper position.
- For more detailed installation information, refer to the *VF Series Butterfly Valves 2 Through 20 in., Two-Way and Three-Way Installation Instructions (LIT-977205X)*.

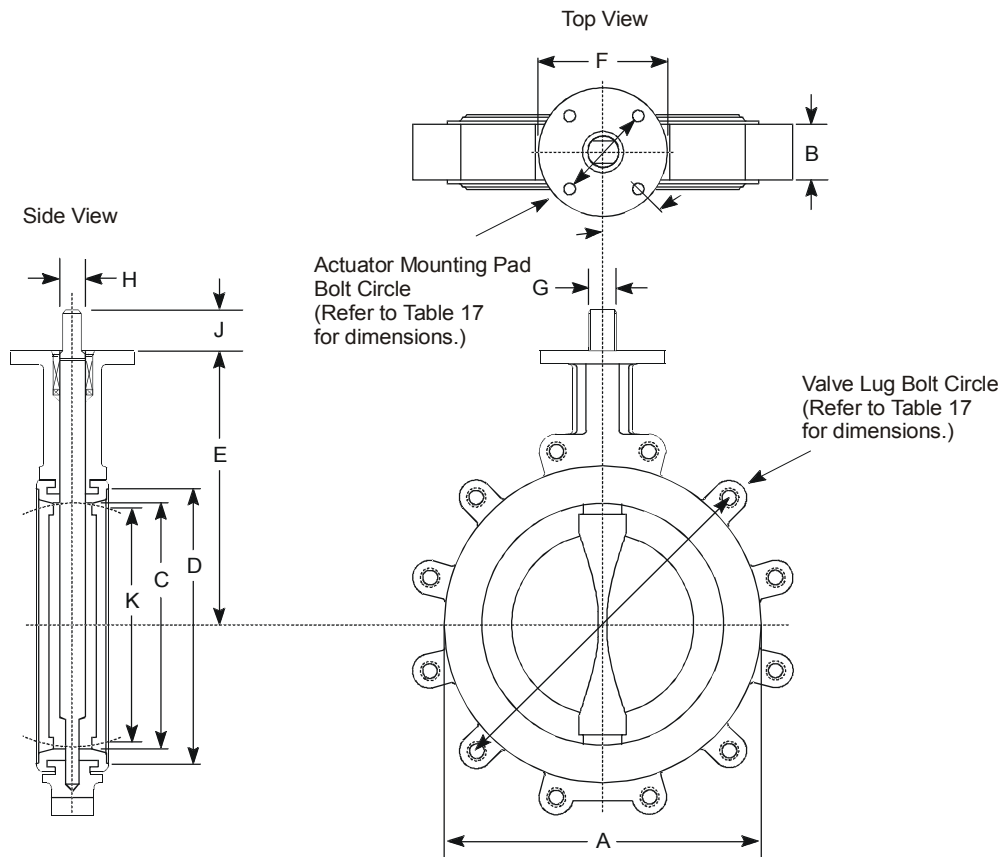


Figure 17: Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valve Dimensions (Refer to Table 16.)

Table 16: Two-Way Valve Dimensions, in.^①

Valve Size, in.	A	B	C	D	E	F	G ^②	H ^②	J	K ^③	Valve Net Weight, lb ^④
2	3-11/16	1-5/8	2	2-27/32	5-1/2	3-17/32	9/16	13/32	1-1/4	1-11/32	7
2-1/2	4-3/16	1-3/4	2-1/2	3-11/32	6	3-17/32	9/16	13/32	1-1/4	1-15/16	8
3	4-7/8	1-3/4	3	4-1/32	6-1/4	3-17/32	9/16	13/32	1-1/4	2-9/16	9
4	6-1/16	2	4	5-5/32	7	3-17/32	5/8	7/16	1-1/4	3-19/32	15
5	7-1/8	2-1/8	5	6-5/32	7-1/2	3-17/32	3/4	17/32	1-1/4	4-21/32	20
6	8-1/8	2-1/8	5-3/4	7	8	3-17/32	3/4	17/32	1-1/4	5-15/32	23
8	10-1/2	2-1/2	7-3/4	9-15/32	9-1/2	5-29/32	7/8	5/8	1-1/4	7-15/32	42
10	12-3/4	2-1/2	9-3/4	11-15/32	10-3/4	5-29/32	1-3/16	7/8	2	9-17/32	66
12	14-7/8	3	11-3/4	13-15/32	12-1/4	5-29/32	1-3/16	7/8	2	11-15/32	88
14	16-15/16	3	13-1/4	15-9/32	13-5/8	5-29/32	1-3/8	---	2	13-1/16	114
16	19-1/16	4	15-1/4	17-5/32	14-3/4	5-29/32	1-3/8	---	2	14-27/32	166
18	21-1/8	4-1/4	17-1/4	19-15/32	16	8-9/32	1-31/32	---	2-1/2	16-27/32	226
20	23-1/4	5	19-1/4	21-19/32	17-1/4	8-9/32	1-31/32	---	2-1/2	18-3/4	305

① in. x 25.4 = mm.

② 2 through 12 in. valves have a “Double D” stem (round shaft with two machined flats), and 14 through 20 in. valves have a round shaft with a keyway and key.

③ Disc chordal dimension at valve face.

④ lb x 0.454 = kg; net weight is for valve only (no actuator).

Table 17: Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valve Actuator Mounting and Valve Lug Bolting^① Dimensions

Valve Size, in.	Actuator Mounting			Valve Lug Bolting		
	Bolt Circle, in. (mm)	Number of Holes ^②	Hole Diameter, in. (mm)	Bolt Circle, in. (mm)	Number of Holes ^③	Threads UNC-2B
2	2-3/4 (70)	4	3/8 (10)	4-3/4 (121)	4	5/8-11
2-1/2				5-1/2 (140)	4	5/8-11
3				6 (152)	4	5/8-11
4				7-1/2 (191)	8	5/8-11
5				8-1/2 (216)	8	3/4-10
6				9-1/2 (241)	8	3/4-10
8	4-29/32 (125)	4	9/16 (14)	11-3/4 (298)	8	3/4-10
10				14-1/4 (362)	12	7/8-9
12				17 (432)	12	7/8-9
14				18-3/4 (476)	12	1-8
16				21-1/4 (540)	16	1-8
18	6-1/2 (165)	4	13/16 (21)	22-3/4 (578)	16	1-1/8-7
20				25 (635)	20	1-1/8-7

① For bolting requirements, refer to Table 19.

② Actuator mounting holes are drilled only (not tapped).

③ Lug holes are drilled and tapped and evenly spaced around the valve.

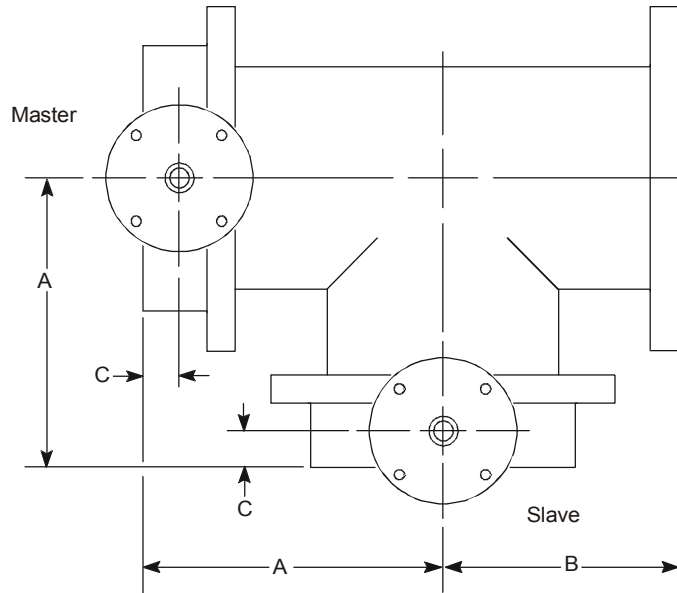


Figure 18: Three-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valve Dimensions (Refer to Table 18.)

Table 18: Three-Way Valve Dimensions, in. (mm)*

Valve Size, in.	A	B	C
2	6-1/8 (155)	4-1/2 (114)	13/16 (21)
2-1/2	6-3/4 (171)	5 (127)	7/8 (22)
3	7-1/4 (184)	5-1/2 (140)	7/8 (22)
4	8-1/2 (216)	6-1/2 (165)	1 (25)
5	9-5/8 (244)	7-1/2 (191)	1-1/16 (27)
6	10-1/8 (257)	8 (203)	1-1/16 (27)
8	11-1/2 (292)	9 (229)	1-1/4 (32)
10	13-1/2 (343)	11 (279)	1-1/4 (32)
12	15 (381)	12 (305)	1-1/2 (38)

* The actuator(s) is always mounted on the master valve.

**Table 19: Flange Screws Required for VF Series
Standard-Pressure, Standard-Temperature Butterfly Valves**

Valve Size, in.	Regular Hex-Head Screws with National Course Threads		
	Diameter, in. (mm)	Length, in. (mm)	Number Required
2	5/8 (16)	1-1/2 (38)	8
2-1/2	5/8 (16)	1-1/2 (38)	8
3	5/8 (16)	1-3/4 (44)	8
4	5/8 (16)	1-3/4 (44)	16
5	3/4 (19)	1-3/4 (44)	16
6	3/4 (19)	2 (51)	16
8	3/4 (19)	2-1/4 (57)	16
10	7/8 (22)	2-1/4 (57)	24
12	7/8 (22)	2-1/2 (64)	24
14	1 (25)	2-3/4 (70)	24
16	1 (25)	3-1/4 (83)	32
18	1-1/8 (29)	3-1/2 (89)	32
20	1-1/8 (29)	3-1/4 (83)	8
		4 (102)	32

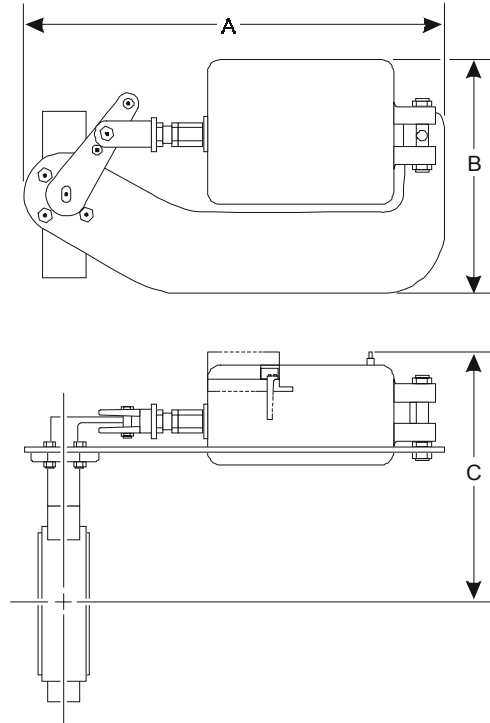


Figure 19: Single Pneumatic Piston Actuator Assembled on a Two-Way Butterfly Valve

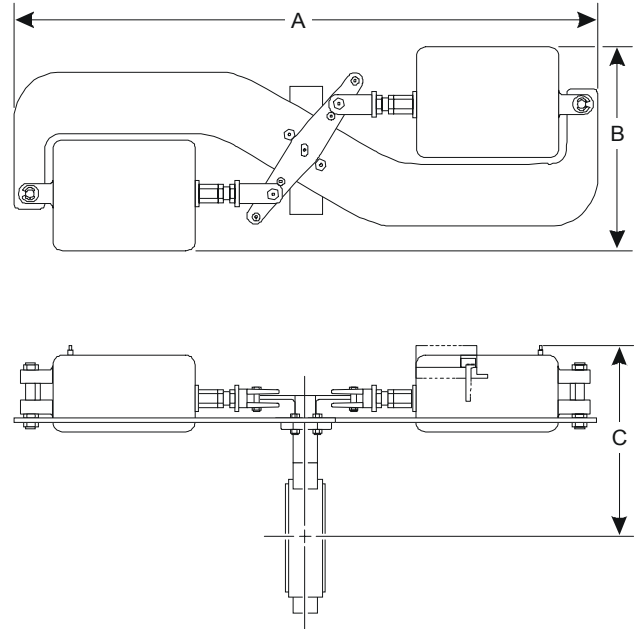


Figure 20: Dual Tandem Pneumatic Piston Actuators Assembled on a Two-Way Butterfly Valve

Table 20: Overall Dimensions of D-3153, D-3244, and D-3246 Series Pneumatic Piston Actuators Assembled on Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves, in. (mm)

Valve Size, in.	Single Pistons (Refer to Figure 19.)									Dual Tandem Pistons (Refer to Figure 20.)		
	One D-3153 = -001			One D-3244 = -002			One D-3246 = -003			Two D-3246s = -005		
	A	B	C*	A	B	C*	A	B	C*	A	B	C*
2	16 (406)	8-3/8 (213)	8-1/4 (210)	---	---	---	---	---	---	---	---	---
2-1/2	16 (406)	8-3/8 (213)	9-1/8 (232)	---	---	---	---	---	---	---	---	---
3	16 (406)	8-3/8 (213)	9-3/8 (238)	---	---	---	---	---	---	---	---	---
4	16 (406)	8-3/8 (213)	10-1/8 (257)	20 (508)	11-1/2 (292)	13-3/4 (349)	---	---	---	---	---	---
5	---	---	---	20 (508)	11-1/2 (292)	14-3/8 (365)	25-7/8 (657)	13-1/2 (343)	14-3/8 (365)	---	---	---
6	---	---	---	---	---	---	25-7/8 (657)	13-1/2 (343)	14-7/8 (378)	---	---	---
8	---	---	---	---	---	---	25-7/8 (657)	13-1/2 (343)	16-3/8 (416)	---	---	---
10	---	---	---	---	---	---	---	---	---	45-1/2 (1,156)	16-3/8 (416)	17-5/8 (448)

* Allow a clearance of 6 in. (153 mm) for removal of the D-3153; 7-1/2 in. (191 mm) for removal of the D-3244 or D-3246.

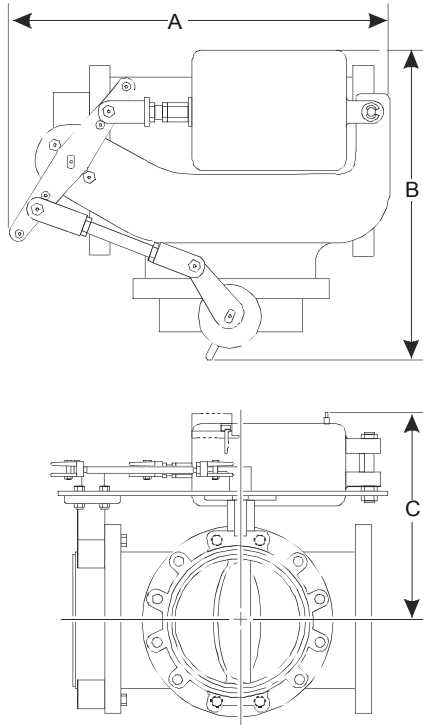


Figure 21: Single Pneumatic Piston Actuator Assembled on a Three-Way Butterfly Valve

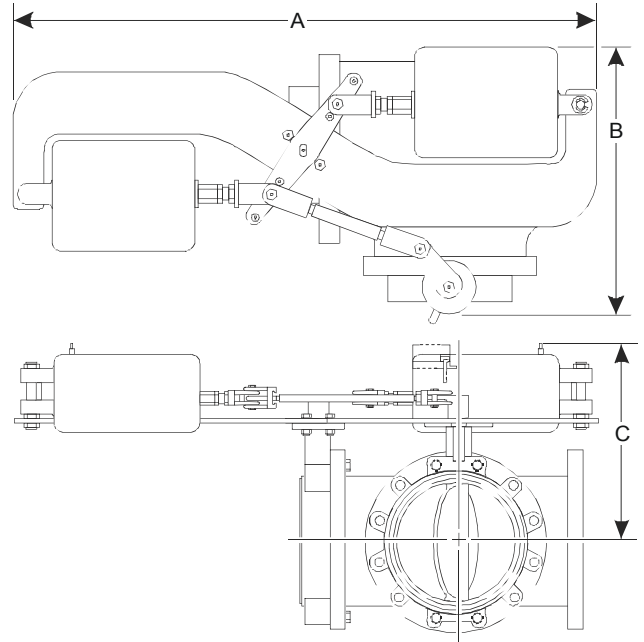


Figure 22: Dual Tandem Pneumatic Piston Actuators Assembled on a Three-Way Butterfly Valve

Table 21: Overall Dimensions of D-3153, D-3244, and D-3246 Series Pneumatic Piston Actuators Assembled on Three-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves, in. (mm)

Valve Size, in.	Single Pistons (Refer to Figure 21.)									Dual Tandem Pistons (Refer to Figure 22.)		
	One D-3153 = -001			One D-3244 = -002			One D-3246 = -003			Two D-3246s = -005		
	A	B	C*	A	B	C*	A	B	C*	A	B	C*
2	17-3/4 (451)	12 (305)	8-5/8 (219)	---	---	---	---	---	---	---	---	---
2-1/2	---	---	---	21-3/4 (553)	14-3/8 (365)	9-1/8 (232)	---	---	---	---	---	---
3	---	---	---	21-3/4 (553)	14-7/8 (378)	9-3/8 (238)	---	---	---	---	---	---
4	---	---	---	21-3/4 (553)	16 (407)	10-1/8 (257)	31-1/8 (791)	17-3/8 (442)	13-3/4 (349)	---	---	---
5	---	---	---	---	---	---	31-1/8 (791)	18-1/2 (470)	14-3/8 (365)	---	---	---
6	---	---	---	---	---	---	31-1/8 (791)	18-1/2 (470)	14-7/8 (378)	45-1/2 (1,156)	18-1/2 (470)	14-7/8 (378)
8	---	---	---	---	---	---	---	---	---	45-1/2 (1,156)	21-3/8 (543)	16-3/8 (416)

* Allow a clearance of 6 in. (153 mm) for removal of the D-3153; 7-1/2 in. (191 mm) for removal of the D-3244 or D-3246.

Table 22: Height Requirements, in. (mm) for V-9000 Series Pneumatic Actuated Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves (Above Centerline of Pipe; Includes 6 in. Head Clearance)^{①②}

Valve Size, in.	V-9000 Series Pneumatic Actuator							
	V-9x92	V-9x93	V-9x94-1	V-9x94-2	V-9x95	V-9x96	V-9x97	V-9x98
2	22-5/16 (567)	23-7/32 (590)	23-9/16 (598)	24-15/16 (633)	25-3/4 (654)	---	---	---
2-1/2	22-13/16 (579)	23-23/32 (602)	24-1/16 (611)	25-7/16 (646)	26-1/4 (667)	---	---	---
3	23-1/16 (586)	23-31/32 (609)	24-5/16 (618)	25-11/16 (652)	26-1/2 (673)	---	---	---
4	---	24-23/32 (628)	25-1/16 (637)	26-7/16 (672)	27-1/4 (692)	---	---	---
5	---	25-7/32 (641)	25-9/16 (649)	26-15/16 (684)	27-3/4 (705)	30-1/8 (765)	---	---
6	---	25-23/32 (653)	26-1/16 (662)	27-7/16 (697)	28-1/4 (718)	30-5/8 (778)	32-7/8 (835)	---
8	---	---	---	28-15/16 (735)	29-3/4 (756)	32-1/8 (816)	34-3/8 (873)	---
10	---	---	---	30-3/16 (767)	31 (787)	33-3/8 (848)	35-5/8 (905)	---
12	---	---	---	32-3/16 (818)	32-1/2 (826)	35-1/8 (892)	37-1/8 (943)	---
14	---	---	---	---	---	---	38-1/2 (978)	40-11/32 (1,025)
16	---	---	---	---	---	---	39-5/8 (1,006)	41-15/32 (1,053)
18	---	---	---	---	---	---	40-7/8 (1,038)	42-23/32 (1,085)
20	---	---	---	---	---	---	42-1/8 (1,070)	43-31/32 (1,117)

① The overall height requirements listed for V-9x92, V-9x93, V-9x94, and V-9x95 actuated VF Series Standard-Pressure, Standard-Temperature Butterfly Valves include 6-1/2 in. (165 mm) for a positioner; overall height requirements for V-9x96, V-9x97, and V-9x98 actuated assemblies include 7-1/2 in. (191 mm) for a positioner.

② If a positioner is mounted on a travel switch, add 7 in. (178 mm) to the overall height requirement listed above.

Table 23: Height Requirements, in. (mm) for V-9000 Series Pneumatic Actuated Three-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves (Above Centerline of Pipe; Includes 6 in. Head Clearance)^{①②}

Valve Size, in.	V-9000 Series Pneumatic Actuator						
	V-9x92	V-9x93	V-9x94-1	V-9x94-2	V-9x95	V-9x96	V-9x97
2	26-5/16 (668)	27-7/32 (691)	27-9/16 (700)	28-15/16 (735)	29-3/4 (756)	---	---
2-1/2	26-13/16 (681)	27-23/32 (704)	28-1/16 (713)	29-7/16 (748)	30-1/4 (768)	---	---
3	27-1/16 (687)	27-31/32 (710)	28-5/16 (719)	29-11/16 (754)	30-1/2 (775)	---	---
4	---	28-23/32 (729)	29-1/16 (738)	30-7/16 (773)	31-1/4 (794)	---	---
5	---	29-7/32 (742)	29-9/16 (751)	30-15/16 (786)	31-3/4 (806)	34-1/8 (867)	---
6	---	29-23/32 (755)	30-1/16 (764)	31-7/16 (799)	32-1/4 (819)	34-5/8 (879)	36-7/8 (937)
8	---	---	---	32-15/16 (837)	33-3/4 (857)	36-1/8 (918)	38-3/8 (975)
10	---	---	---	34-3/16 (868)	35 (889)	37-3/8 (949)	39-5/8 (1,006)
12	---	---	---	36-3/16 (919)	36-1/2 (927)	39-1/8 (994)	41-1/8 (1,045)

① The overall height requirements listed for V-9x92, V-9x93, V-9x94, and V-9x95 actuated VF Series Standard-Pressure, Standard-Temperature Butterfly Valves include 6-1/2 in. (165 mm) for a positioner; overall height requirements for V-9x96 and V-9x97 actuated assemblies include 7-1/2 in. (191 mm) for a positioner.

② If a positioner is mounted on a travel switch, add 7 in. (178 mm) to the overall height requirement listed above.

Table 24: Length and Width Requirements, in. (mm) for V-9000 Series Pneumatic Actuated Two-Way and Three-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves

Dimension	V-9000 Series Pneumatic Actuator							
	V-9x92	V-9x93	V-9x94-1	V-9x94-2	V-9x95	V-9x96	V-9x97	V-9x98
Length	6 (152)	7-29/32 (201)	8-29/32 (226)	12-3/32 (307)	12-11/32 (314)	15-15/32 (393)	18-15/16 (481)	28-1/8 (714)
Width*	8-25/32 (223)	9-19/32 (244)	9-15/16 (252)	10-3/4 (273)	11-13/32 (290)	12-25/32 (325)	14-27/32 (377)	16-3/4 (425)

* The overall width requirements listed above include 6 in. (152 mm) for a solenoid air valve. The above dimensions are for the actuator and accessories only; refer to Table 18 for the three-way valve dimensions.

Table 25: Height Requirements, in. (mm) for VA-9000 Series Electric Actuated Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves (Above Centerline of Pipe; Includes 10 in. Head Clearance)

Valve Size, in.	VA-9000 Series Electric Actuator			
	VA-9007-01	VA-9007-02	VA-9008-01	VA-9008-02
16	41-1/2 (1,054)	41-1/2 (1,054)	48-3/4 (1,238)	48-3/4 (1,238)
18	42-3/4 (1,086)	42-3/4 (1,086)	50 (1,270)	50 (1,270)
20	44 (1,118)	44 (1,118)	51-1/4 (1,302)	51-1/4 (1,302)

Table 26: Length and Width Requirements, in. (mm) for VA-9000 Series Electric Actuated Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves

Dimension	VA-9000 Series Electric Actuator			
	VA-9007-01	VA-9007-02	VA-9008-01	VA-9008-02
Length	13-1/3 (339)	13-1/3 (339)	12-3/8 (314)	12-3/8 (314)
Width ^①	12-7/8 (327)	12-7/8 (327)	34 ^② (864)	34 ^② (864)

① Allow sufficient clearance for manual operation of the hand wheel.

② The overall width requirements for the VA-9008-0x actuated assemblies include 10 in. (254 mm) of clearance for removal of the actuator cover.

Table 27: Height Requirements, in. (mm) for VA-9070 Series Electric Actuated Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves (Above Centerline of Pipe; Includes 6 in. Head Clearance)^{①②}

Valve Size, in.	VA-9070 Series Electric Actuator							
	VA-9071	VA-9072	VA-9073	VA-9074	VA-9075	VA-9076	VA-9077	VA-9078
2	18-7/32 (463)	18-7/32 (463)	19-5/8 (498)	19-5/8 (498)	19-5/8 (498)	20-5/16 (516)	20-5/16 (516)	20-5/16 (516)
2-1/2	18-23/32 (475)	18-23/32 (475)	20-1/8 (511)	20-1/8 (511)	20-1/8 (511)	20-13/16 (529)	20-13/16 (529)	20-13/16 (529)
3	18-31/32 (482)	18-31/32 (482)	20-3/8 (518)	20-3/8 (518)	20-3/8 (518)	21-1/16 (535)	21-1/16 (535)	21-1/16 (535)
4	19-23/32 (501)	19-23/32 (501)	21-1/8 (537)	21-1/8 (537)	21-1/8 (537)	21-13/16 (554)	21-13/16 (554)	21-13/16 (554)
5	19-29/32 (506)	19-29/32 (506)	21-5/8 (549)	21-5/8 (549)	21-5/8 (549)	22-5/16 (567)	22-5/16 (567)	22-5/16 (567)
6	20-23/32 (526)	20-23/32 (526)	22-1/8 (562)	22-1/8 (562)	22-1/8 (562)	22-13/16 (579)	22-13/16 (579)	22-13/16 (579)
8	22-7/32 (564)	22-7/32 (564)	23-5/8 (600)	23-5/8 (600)	23-5/8 (600)	24-5/16 (618)	24-5/16 (618)	24-5/16 (618)
10	23-15/32 (596)	23-15/32 (596)	24-7/8 (632)	24-7/8 (632)	24-7/8 (632)	25-9/16 (649)	25-9/16 (649)	25-9/16 (649)
12	24-31/32 (634)	24-31/32 (634)	26-3/8 (670)	26-3/8 (670)	26-3/8 (670)	27-1/16 (687)	27-1/16 (687)	27-1/16 (687)
14	26-11/32 (669)	26-11/32 (669)	27-3/4 (705)	27-3/4 (705)	27-3/4 (705)	28-7/16 (722)	28-7/16 (722)	28-7/16 (722)
16	27-15/32 (698)	27-15/32 (698)	28-7/8 (733)	28-7/8 (733)	28-7/8 (733)	29-9/16 (751)	29-9/16 (751)	29-9/16 (751)
18	28-23/32 (729)	28-23/32 (729)	30-1/8 (765)	30-1/8 (765)	30-1/8 (765)	30-13/16 (783)	30-13/16 (783)	30-13/16 (783)

① The overall height requirements listed above include 1-5/8 in. (41 mm) for a position indicator.

② Allow appropriate clearance for conduit connections.

Table 28: Height Requirements, in. (mm) for VA-9070 Series Electric Actuated Three-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves (Above Centerline of Pipe; Includes 6 in. Head Clearance)^{①②}

Valve Size, in.	VA-9070 Series Electric Actuator							
	VA-9071	VA-9072	VA-9073	VA-9074	VA-9075	VA-9076	VA-9077	VA-9078
2	22-7/32 (564)	22-7/32 (564)	23-5/8 (600)	23-5/8 (600)	23-5/8 (600)	24-5/16 (618)	24-5/16 (618)	24-5/16 (618)
2-1/2	22-23/32 (577)	22-23/32 (577)	24-1/8 (613)	24-1/8 (613)	24-1/8 (613)	24-13/16 (630)	24-13/16 (630)	24-13/16 (630)
3	22-31/32 (583)	22-31/32 (583)	24-3/8 (619)	24-3/8 (619)	24-3/8 (619)	25-1/16 (637)	25-1/16 (637)	25-1/16 (637)
4	23-23/32 (602)	23-23/32 (602)	25-1/8 (638)	25-1/8 (638)	25-1/8 (638)	25-13/16 (656)	25-13/16 (656)	25-13/16 (656)
5	23-29/32 (607)	23-29/32 (607)	25-5/8 (651)	25-5/8 (651)	25-5/8 (651)	26-5/16 (668)	26-5/16 (668)	26-5/16 (668)
6	24-23/32 (628)	24-23/32 (628)	26-1/8 (664)	26-1/8 (664)	26-1/8 (664)	26-13/16 (681)	26-13/16 (681)	26-13/16 (681)
8	26-7/32 (666)	26-7/32 (666)	27-5/8 (702)	27-5/8 (702)	27-5/8 (702)	28-5/16 (719)	28-5/16 (719)	28-5/16 (719)
10	27-15/32 (698)	27-15/32 (698)	28-7/8 (733)	28-7/8 (733)	28-7/8 (733)	29-9/16 (751)	29-9/16 (751)	29-9/16 (751)
12	28-31/32 (736)	28-31/32 (736)	30-3/8 (772)	30-3/8 (772)	30-3/8 (772)	31-1/16 (789)	31-1/16 (789)	31-1/16 (789)

① The overall height requirements listed above include 1-5/8 in. (41 mm) for a position indicator.

② Allow appropriate clearance for conduit connections.

Table 29: Length and Width Requirements, in. (mm) for VA-9070 Series Electric Actuated Two-Way and Three-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves*

Dimension	VA-9070 Series Electric Actuator							
	VA-9071	VA-9072	VA-9073	VA-9074	VA-9075	VA-9076	VA-9077	VA-9078
Length	12-15/16 (329)	12-15/16 (329)	16-15/32 (418)	16-15/32 (418)	16-15/32 (418)	19-5/32 (487)	19-5/32 (487)	19-5/32 (487)
Width	7-1/2 (191)	7-1/2 (191)	10-3/32 (256)	10-3/32 (256)	10-3/32 (256)	12-3/32 (307)	12-3/32 (307)	12-3/32 (307)

* The above dimensions are for the actuator only, refer to Table 18 for the three-way valve dimensions.

Table 30: Valve Flow Coefficients, Cv (kv)

Valve Size, in.	Disc Position, Degrees Open*								
	90° Maximum Stroke for Electric or Pneumatic Rack and Pinion Manual Valves	80°	70° Maximum Stroke for Valves with D-3000 Pneumatic Piston Actuators	60°	50°	40°	30°	20°	10°
2	144 (123)	114 (98)	84 (72)	61 (52)	43 (37)	27 (23)	16 (14)	7 (6)	1 (0.9)
2-1/2	282 (242)	223 (191)	163 (140)	107 (92)	67 (57)	43 (37)	24 (21)	11 (9)	1.5 (1)
3	461 (395)	364 (312)	267 (229)	154 (132)	96 (82)	61 (52)	35 (30)	15 (13)	2 (2)
4	841 (721)	701 (601)	496 (425)	274 (235)	171 (147)	109 (93)	62 (53)	27 (23)	3 (3)
5	1,376 (1,179)	1,146 (982)	775 (664)	428 (367)	268 (230)	170 (146)	98 (84)	43 (37)	5 (4)
6	1,850 (1,585)	1,542 (1,322)	1,025 (878)	567 (486)	354 (303)	225 (193)	129 (111)	56 (48)	6 (5)
8	3316 (2,842)	2,842 (2,436)	1,862 (1,596)	1,081 (926)	680 (583)	421 (361)	241 (207)	102 (87)	12 (10)
10	5,430 (4,654)	4,525 (3,878)	2,948 (2,526)	1,710 (1,465)	1,076 (922)	667 (572)	382 (327)	162 (139)	19 (16)
12	8,077 (6,922)	6,731 (5,769)	4,393 (3,765)	2,563 (2,197)	1,594 (1,366)	1,005 (861)	555 (476)	235 (201)	27 (23)
14	10,538 (9,031)	8,874 (7,605)	5,939 (5,090)	3,384 (2,900)	2,149 (1,842)	1,320 (1,131)	756 (648)	299 (256)	34 (29)
16	13,966 (11,969)	11,761 (10,079)	7,867 (6,742)	4,483 (3,842)	2,847 (2,440)	1,749 (1,499)	1,001 (858)	397 (340)	45 (39)
18	17,214 (14,752)	14,496 (12,423)	10,065 (8,626)	5,736 (4,916)	3,643 (3,122)	2,237 (1,917)	1,281 (1,098)	507 (435)	58 (50)
20	22,339 (19,145)	18,812 (16,122)	12,535 (10,743)	7,144 (6,122)	4,536 (3,887)	2,786 (2,388)	1,595 (1,367)	632 (542)	72 (62)

* Recommended disc rotation is between 30° and 70° open; preferred disc rotation for control valve sizing is 50° to 70° open.

Table 31: Expected Seating/Unseating Torque Values*, lb·in (N·m)

Valve Size, in.	Two-Way Valves					Three-Way Valves				
	“H” Valves ΔP Pressure, psig (kPa)				“L” Valves ΔP Pressure 50 psig (345 kPa)	“H” Valves ΔP Pressure, psig (kPa)				“L” Valves ΔP Pressure 50 psig (345 kPa)
	50 (345)	100 (689)	150 (1,034)	175 (1,206)		50 (345)	100 (689)	150 (1,034)	175 (1,206)	
2	121 (14)	123 (14)	125 (14)	126 (14)	---	145 (16)	148 (17)	150 (17)	151 (17)	---
2-1/2	140 (16)	144 (16)	148 (17)	150 (17)	---	168 (19)	173 (20)	177 (20)	180 (20)	---
3	163 (18)	170 (19)	177 (20)	180 (20)	---	196 (22)	204 (23)	212 (24)	216 (24)	---
4	345 (39)	356 (40)	367 (42)	372 (42)	180 (20)	414 (47)	427 (48)	440 (50)	446 (50)	216 (24)
5	430 (49)	445 (50)	460 (52)	468 (53)	312 (35)	516 (58)	534 (60)	552 (62)	562 (64)	374 (42)
6	526 (59)	541 (61)	556 (63)	564 (64)	456 (52)	631 (71)	649 (73)	667 (75)	677 (77)	547 (62)
8	1,099 (124)	1,149 (130)	1,199 (136)	1,224 (138)	564 (64)	1,319 (149)	1,379 (156)	1,439 (163)	1,469 (166)	677 (77)
10	2,037 (230)	2,291 (259)	2,546 (288)	2,637 (298)	1,128 (127)	2,444 (276)	2,749 (311)	3,055 (345)	3,164 (358)	1,354 (153)
12	3,110 (351)	3,519 (398)	3,928 (444)	4,132 (467)	2,074 (234)	3,732 (421)	4,223 (477)	4,714 (533)	4,958 (560)	2,489 (281)
14	4,500 (508)	5,182 (586)	5,864 (663)	---	3,000 (339)	---	---	---	---	---
16	5,819 (658)	7,000 (791)	8,182 (924)	---	3,880 (438)	---	---	---	---	---
18	7,182 (812)	9,000 (1,017)	10,819 (1,222)	---	4,788 (541)	---	---	---	---	---
20	9,364 (1,058)	11,728 (1,325)	14,091 (1,592)	---	6,243 (705)	---	---	---	---	---

* Does not include safety factor.

Pneumatic Piston Actuators

Pneumatic piston actuators can be purchased separately and field mounted to manual VFM Series Valve bodies. These actuators can also be used as unit replacements, when repairing existing pneumatic piston actuators that are already mounted to VF Series Standard-Pressure, Standard-Temperature Butterfly Valve assemblies. Refer to Table 32 for a listing of models available.

Table 32: Pneumatic Piston Actuators for Use with VF Series Standard-Pressure, Standard-Temperature Butterfly Valves

Pneumatic Piston Actuator Code Number	Description
D-3153-5120	Pneumatic Piston Actuator <u>with</u> Positioner, for Use with 2, 2-1/2, or 3 in. 175 or 150 psig Valves or 4 in. 50 psig Valves
D-3153-5130	Pneumatic Piston Actuator <u>without</u> Positioner, for Use with 2, 2-1/2, or 3 in. 175 or 150 psig Valves or 4 in. 50 psig Valves
D-3244-5100	Pneumatic Piston Actuator <u>with</u> Positioner, for Use with 4 in. 175 or 150 psig Valves or 5 in. 50 psig Valves
D-3244-5110	Pneumatic Piston Actuator <u>without</u> Positioner, for Use with 4 in. 175 or 150 psig Valves or 5 in., 50 psig Valves
D-3246-5100	Pneumatic Piston Actuator <u>with</u> Positioner, for Use with 5 or 6 in. 175 or 150 psig Valves or 6, 8, or 10 in. 50 psig Valves
D-3246-5110	Pneumatic Piston Actuator <u>without</u> Positioner, for Use with 5 or 6 in. 175 or 150 psig Valves or 6, 8, or 10 in. (Requires Two Actuators) 50 psig Valves

Table 33: Descriptions of Mounting Kits for Field Mounting D-3000 Series Pneumatic Piston Actuators on Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves
(Refer to Table 34 for more detailed selection information.)

Mounting Kit* Code Number	Description
VF-001-602	D-3153-51x0 Actuator Mounting Kit for Normally Closed 2, 2-1/2, or 3 in. 175 or 150 psig Valves
VF-001-603	D-3153-51x0 Actuator Mounting Kit for Normally Open 2, 2-1/2, or 3 in. 175 or 150 psig Valves
VF-001-604	D-3513-51x0 Actuator Mounting Kit for Normally Closed 4 in. 50 psig Valves
VF-001-605	D-3153-51x0 Actuator Mounting Kit for Normally Open 4 in. 50 psig Valves
VF-002-602	D-3244-51x0 Actuator Mounting Kit for Normally Closed 4 in. 175 or 150 psig Valves
VF-002-603	D-3244-51x0 Actuator Mounting Kit for Normally Open 4 in. 175 or 150 psig Valves
VF-002-604	D-3244-51x0 Actuator Mounting Kit for Normally Closed 5 in. 175 or 150 psig Valves
VF-002-605	D-3244-51x0 Actuator Mounting Kit for Normally Open 5 in. 50 psig Valves
VF-003-602	D-3246-51x0 Actuator Mounting Kit for Normally Closed 5 in. 175 or 150 psig Valves
VF-003-603	D-3246-51x0 Actuator Mounting Kit for Normally Open 5 in. 175 or 150 psig Valves
VF-003-604	D-3246-51x0 Actuator Mounting Kit for Normally Closed 6 in. 175, 150, or 50 psig Valves
VF-003-605	D-3246-51x0 Actuator Mounting Kit for Normally Open 6 in. 175, 150, or 50 psig Valves
VF-003-606	D-3246-51x0 Actuator Mounting Kit for Normally Closed 8 in. 50 psig Valves
VF-003-607	D-3246-51x0 Actuator Mounting Kit for Normally Open 8 in. 50 psig Valves
VF-005-602	D-3246-51x0 Actuator Mounting Kit for Normally Closed 10 in. 175 or 150 psig Valves (Includes Parts for Mounting Two Actuators)
VF-005-603	D-3246-51x0 Actuator Mounting Kit for Normally Open 10 in. 50 psig Valves (Includes Parts for Mounting Two Actuators)

* The mounting kits contain a mounting bracket, crankarm, sleeve adaptor, a clevis kit, and all necessary hardware for completing actuator field mounting.

Table 34: Mounting Kits and Actuators for Field Mounting D-3000 Series Pneumatic Piston Actuators on Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves

Valve Size, in.	Action	Pressure	Type	Desired VF Assembly	Manual VF Assembly	Actuator Code Number	Mounting Kit ^① Code Number			
2, 2-1/2, 3	N.C.	High	Without Positioner	VFC-020HB-001N	VFM-020HB-000N	D-3153-5130	VF-001-602			
				VFC-025HB-001N	VFM-025HB-000N					
				VFC-030HB-001N	VFM-030HB-000N					
			With Positioner	VFC-020HB-001A	VFM-020HB-000N	D-3153-5120				
				VFC-025HB-001A	VFM-025HB-000N					
				VFC-030HB-001A	VFM-030HB-000N					
	N.O.		Without Positioner	VFN-020HB-001N	VFM-030HB-000N	D-3153-5130	VF-001-603			
				VFN-025HB-001N	VFM-025HB-000N					
				VFN-030HB-001N	VFM-030HB-000N					
			With Positioner	VFN-020HB-001A	VFM-020HB-000N	D-3153-5120				
				VFN-025HB-001A	VFM-025HB-000N					
				VFN-030HB-001A	VFM-030HB-000N					
4	N.C.	Low	Without Positioner	VFC-040LB-001N	VFM-04LB-000N	D-3153-5130	VF-001-604			
				With Positioner		VFC-040LB-001A		D-3153-5120		
			Without Positioner	VFN-040LB-001N		D-3153-5130		VF-001-605		
				With Positioner		VFN-040LB-001A			D-3153-5120	
	N.O.		High	Without Positioner		VFC-040HB-002N	VFM-04HB-000N		D-3244-5110	VF-002-602
						With Positioner			VFC-040HB-002A	
				Without Positioner		VFC-040HB-002N		D-3244-5110	VF-002-603	
						With Positioner		VFC-040HB-002A		D-3244-5100
	5	N.C.	Low	Without Positioner	VFC-050LB-002N	VFM-05LB-000N		D-3244-5110		VF-002-604
					With Positioner			VFC-050LB-002A		
				Without Positioner	VFC-050LB-002N			D-3244-5110	VF-002-605	
					With Positioner			VFC-050LB-002A		
N.O.		High		Without Positioner	VFC-040HB-002N		VFM-04HB-000N	D-3244-5110		VF-002-602
					With Positioner			VFC-040HB-002A		
				Without Positioner	VFC-040HB-002N			D-3244-5110	VF-002-603	
					With Positioner			VFC-040HB-002A		D-3244-5100

Continued on next page . . .

① Mounting kits include a mounting bracket, crankarm, sleeve adaptor, a clevis kit, and all necessary hardware for completing actuator field mounting.

Valve Size, in. (Cont.)	Action	Pressure	Type	Desired VF Assembly	Manual VF Assembly	Actuator Code Number	Mounting Kit ^① Code Number
5	N.C.	High	Without Positioner	VFC-050HB-003N	VFM-050HB-000N	D-3246-5110	VF-003-602
			With Positioner	VFC-050HB-003A		D-3246-5100	
	N.O.		Without Positioner	VFC-050HB-003N		D-3246-5110	VF-003-603
			With Positioner	VFC-050HB-003A		D-3246-5100	
6	N.C.	High	Without Positioner	VFC-060HB-003N	VFM-060HB-000N	D-3246-5110	VF-003-604
		Low		VFC-060LB-003N	VFM-060LB-000N		
		High	With Positioner	VFC-060HB-003A	VFM-060HB-000N	D-3246-5100	
		Low		VFC-060LB-003A	VFM-060LB-000N		
	N.O.	High	Without Positioner	VFN-060HB-003N	VFM-060HB-000N	D-3246-5110	VF-003-605
		Low		VFN-060LB-003N	VFM-060LB-000N		
		High	With Positioner	VFN-060HB-003A	VFM-060HB-000N	D-3246-5100	
		Low		VFN-060LB-003A	VFM-060LB-000N		
8	N.C.	Low	Without Positioner	VFC-080LB-003N	VFM-080LB-000N	D-3246-5110	VF-003-606
			With Positioner	VFC-080LB-003A		D-3246-5100	
	N.O.		Without Positioner	VFN-080LB-003N		D-3246-5110	VF-003-607
			With Positioner	VFN-080LB-003A		D-3246-5100	
10	N.C.	Low	With Positioner	VFC-100LB-005A	VFM-100LB-000N	D-3246-5110, D-3246-5100	VF-005-602
			Without Positioner	VFC-100LB-005N		D-3246-5110, Two Required	
	N.O.		With Positioner	VFN-100LB-005A		D-3246-5110, D-3246-5100	VF-005-603
			With Positioner	VFN-100LB-005N		D-3246-5110, Two Required	

① Mounting kits include a mounting bracket, crankarm, sleeve adaptor, a clevis kit, and all necessary hardware for completing actuator field mounting.

Table 35: Replacement Brackets and Crankarms for Three-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies with D-3000 Series Pneumatic Piston Actuators

Complete VF Series Code Number	Mounting Bracket Code Number	Master Lever Crankarm Code Number	Slave Lever Crankarm Code Number
VFD-020HA-001N or -001A	VF-001-601	VF-00X-603	VF-00X-608
VFE-020HA-001N or -001A	VF-001-601	VF-00X-604	VF-00X-607
VFF-020HA-001N or -001A	VF-001-601	VF-00X-604	VF-00X-607
VFG-020HA-001N or -001A	VF-001-601	VF-00X-603	VF-00X-608
VGD-025HA-002N or -002A	VF-002-601	VF-00X-603	VF-00X-608
VFE-025HA-002N or -002A	VF-002-601	VF-00X-604	VF-00X-607
VFF-025HA-002N or -002A	VF-002-601	VF-00X-604	VF-00X-607
VFG-025HA-002N or -002A	VF-002-601	VF-00X-603	VF-00X-608
VFD-030HA-002N or -002A	VF-002-601	VF-00X-603	VF-00X-608
VFE-030HA-002N or -002A	VF-002-601	VF-00X-604	VF-00X-607
VFF-030HA-002N or -002A	VF-002-601	VF-00X-604	VF-00X-607
VFG-030HA-002N or -002A	VF-002-601	VF-00X-603	VF-00X-608
VFD-040LA-002N or -002A	VF-002-601	VF-00X-603	VF-00X-608
VFE-040LA-002N or -002A	VF-002-601	VF-00X-604	VF-00X-607
VFF-040LA-002N or -002A	VF-002-601	VF-00X-604	VF-00X-607
VFG-040LA-002N or -002A	VF-002-601	VF-00X-603	VF-00X-608
VFD-040HA-003N or -003A	VF-003-601	VF-00X-603	VF-00X-606
VFE-040HA-003N or -003A	VF-003-601	VF-00X-604	VF-00X-605
VFF-040HA-003N or -003A	VF-003-601	VF-00X-604	VF-00X-605
VFG-040HA-003N or -003A	VF-003-601	VF-00X-603	VF-00X-606
VFD-050LA-003N or -003A	VF-003-601	VF-00X-603	VF-00X-606
VFE-050LA-003N or -003A	VF-003-601	VF-00X-604	VF-00X-605
VFF-050LA-003N or -003A	VF-003-601	VF-00X-604	VF-00X-605
VFG-050LA-003N or -003A	VF-003-601	VF-00X-603	VF-00X-606
VFD-050HA-003N or -003A	VF-003-601	VF-00X-603	VF-00X-606
VFE-050HA-003N or -003A	VF-003-601	VF-00X-604	VF-00X-605
VFF-050HA-003N or -003A	VF-003-601	VF-00X-604	VF-00X-605
VFG-050HA-003N or -003A	VF-003-601	VF-00X-603	VF-00X-606
VFD-060LA-003N or -003A	VF-003-601	VF-00X-603	VF-00X-606
VFE-060LA-003N or -003A	VF-003-601	VF-00X-604	VF-00X-605
VFF-060LA-003N or -003A	VF-003-601	VF-00X-604	VF-00X-605
VFG-060LA-003N or -003A	VF-003-601	VF-00X-603	VF-00X-606
VFD-060HA-005N or -005A	VF-005-601	VF-00X-603	VF-00X-606
VFE-060HA-005N or -005A	VF-005-601	VF-00X-604	VF-00X-605
VFF-060HA-005N or -005A	VF-005-601	VF-00X-604	VF-00X-605
VFG-060HA-005N or -005A	VF-005-601	VF-00X-603	VF-00X-606
VFD-080LA-005N or -005A	VF-005-601	VF-00X-603	VF-00X-606
VFE-080LA-005N or -005A	VF-005-601	VF-00X-604	VF-00X-605
VFF-080LA-005N or -005A	VF-005-601	VF-00X-604	VF-00X-605
VFG-080LA-005N or -005A	VF-005-601	VF-00X-603	VF-00X-606

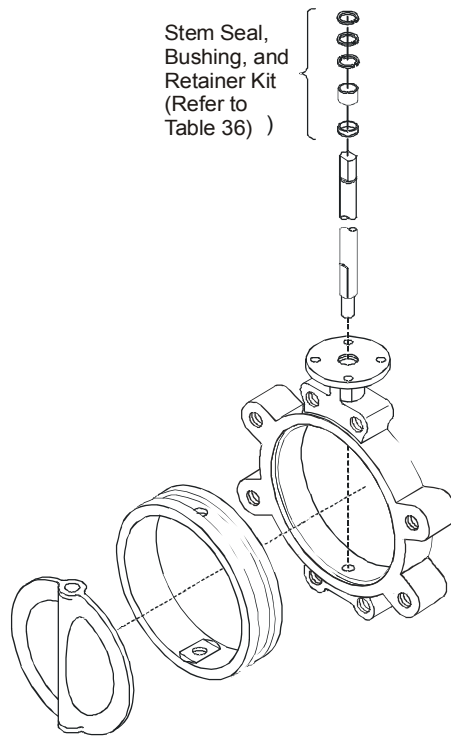


Figure 23: VF Series Standard-Pressure, Standard-Temperature Butterfly Valve Repair Parts

Table 36: VF Series Standard-Pressure, Standard-Temperature Butterfly Valve Repair Parts

Valve Size, in.	Stem Seal, Bushing, and Retainer Kit
2	VF-025-604
2-1/2	VF-025-604
3	VF-025-604
4	VF-040-604
5	VF-060-604
6	VF-060-604
8	VF-080-604
10	VF-120-604
12	VF-120-604
14	VF-140-604
16	VF-160-604
18	VF-200-604
20	VF-200-604

**Table 37: Crankarms for Field Mounting D-3153, D-3244, and D-3246
Series Pneumatic Actuators to Two-Way VF Series Standard-Pressure, Standard-Temperature
Butterfly Valves**

Pneumatic Actuator	Actuator Sub-Code	Valve Configuration	Actuator Crankarm
One D-3153	-001	Normally Closed	VF-00X-601
		Normally Open	VF-00X-602
One D-3244	-002	Normally Closed	VF-00X-601
		Normally Open	VF-00X-602
One D-3246	-003	Normally Closed	VF-00X-601
		Normally Open	VF-00X-602
Two D-3246s	-005	Normally Closed	VF-00X-603
		Normally Open	VF-00X-604

**Table 38: Crankarms for Field Mounting D-3153, D-3244, and D-3246
Series Pneumatic Actuators to Three-Way Series Standard-Pressure,
Standard-Temperature Butterfly Valves**

Pneumatic Actuator	Actuator Sub-Code	Valve Style	Location	Valve Configuration	Master or Slave Crankarm		
One D-3153	-001	Style "D"	Master	Normally Closed	VF-00X-603		
			Slave	Normally Open	VF-00X-608		
		Style "E"	Master	Normally Open	VF-00X-604		
			Slave	Normally Closed	VF-00X-607		
		Style "F"	Master	Normally Closed	VF-00X-604		
			Slave	Normally Open	VF-00X-607		
		Style "G"	Master	Normally Open	VF-00X-603		
			Slave	Normally Closed	VF-00X-608		
		One D-3244	-002	Style "D"	Master	Normally Closed	VF-00X-603
					Slave	Normally Open	VF-00X-608
Style "E"	Master			Normally Open	VF-00X-604		
	Slave			Normally Closed	VF-00X-607		
Style "F"	Master			Normally Closed	VF-00X-604		
	Slave			Normally Open	VF-00X-607		
Style "G"	Master			Normally Open	VF-00X-603		
	Slave			Normally Closed	VF-00X-608		
Continued on next page . . .							

Pneumatic Actuator (Cont.)	Actuator Sub-Code	Valve Style	Location	Valve Configuration	Master or Slave Crankarm
One D-3246	-003	Style "D"	Master	Normally Closed	VF-00X-603
			Slave	Normally Open	VF-00X-606
		Style "E"	Master	Normally Closed	VF-00X-604
			Slave	Normally Open	VF-00X-605
		Style "F"	Master	Normally Closed	VF-00X-604
			Slave	Normally Open	VF-00X-605
Style "G"	Master	Normally Closed	VF-00X-603		
	Slave	Normally Open	VF-00X-606		
Two D-3246s	-005	Style "D"	Master	Normally Closed	VF-00X-603
			Slave	Normally Open	VF-00X-606
		Style "E"	Master	Normally Closed	VF-00X-604
			Slave	Normally Open	VF-00X-605
		Style "F"	Master	Normally Closed	VF-00X-604
			Slave	Normally Open	VF-00X-605
		Style "G"	Master	Normally Closed	VF-00X-603
			Slave	Normally Open	VF-00X-606

Table 39: Mounting Brackets for Field Mounting D-3153, D-3244, and D-3246 Series Pneumatic Actuators

Pneumatic Actuator	Actuator Sub-Code	Mounting Bracket
One D-3153	-001	VF-001-601
One D-3244	-002	VF-002-601
One D-3246	-003	VF-003-601
Two D-3246s	-005	VF-005-601

Table 40: Sleeve Adaptors for Field Mounting D-3153, D-3244, and D-3246 Series Pneumatic Actuators

Valve Size, in.	Sleeve Adaptor
4	D-3244-500
5 and 6	D-3246-600
8	D-3246-800
10	None Required

Table 41: Clevis Kits for Field Repair or Field Mounting D-3153, D-3244, and D-3246 Series Pneumatic Actuators

Pneumatic Actuator	Clevis Kit
D-3153	D-3153-701
D-3244	D-3246-701
D-3246	D-3246-701
Three-Way Tandem Actuators	VF-3WAY-100

Table 42: Mounting Adaptors for Field Mounting V-9000 Series Pneumatic Actuators

Valve Size, in.	Pneumatic Rack and Pinion Actuator							
	V-9x92	V-9x93	V-9x94-1	V-9x94-2	V-9x95	V-9x96	V-9x97	V-9x98
2	None Required	V-9094-300 ①	V-9094-300 ①	V-9095-300 ②	V-9095-300 ②	---	---	---
2-1/2	None Required	V-9094-300 ①	V-9094-300 ①	V-9095-300 ②	V-9095-300 ②	---	---	---
3	None Required	V-9094-300 ①	V-9094-300 ①	V-9095-300 ②	V-9095-300 ②	---	---	---
4	---	V-9094-400 ①	V-9094-400 ①	V-9095-400 ②	V-9095-400 ②	---	---	---
5	---	None Required	None Required	V-9095-600 ②	V-9095-600 ②	V-9096-600 ③	---	---
6	---	None Required	None Required	V-9095-600 ②	V-9095-600 ②	V-9096-600 ③	---	---
8	---	---	---	V-9095-800 ②	V-9095-800 ②	V-9096-800 ②	V-9097-800 ①	---
10	---	---	---	None Required	None Required	None Required	V-9097-120 ①	---
12	---	---	---	None Required	None Required	None Required	V-9097-120 ①	---
14	---	---	---	---	---	---	V-9097-160 ①	V-9098-100 ③
16	---	---	---	---	---	---	V-9097-160 ①	V-9098-100 ③
18	---	---	---	---	---	---	None Required	V-9098-200 ①
20	---	---	---	---	---	---	None Required	V-9098-200 ①

- ① Kit contains one mounting adaptor only (no plate or mounting hardware).
- ② Kit contains two mounting adaptors only (no plate or mounting hardware).
- ③ Kit contains one mounting adaptor with plate and mounting hardware.

Table 43: Mounting and Adaptor Kits for Field Mounting VA-900x Series Electric Actuators to Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves

Valve Size, in.	Electric Actuator	
	VA-9007	VA-9008
16	VA-9007-1600	VA-9008-1600
18	VA-9007-2000	VA-9008-2000
20	VA-9007-2000	VA-9008-2000

Table 44: Mounting and Adaptor Kits for Field Mounting VA-9070 Series Electric Actuators to Two-Way VF Series Standard-Pressure, Standard-Temperature Butterfly Valves

Valve Size, in.	Electric Actuator							
	VA-9071	VA-9072	VA-9073	VA-9074	VA-9075	VA-9076	VA-9077	VA-9078
2	VA-9072- 300	VA-9072- 300	---	---	---	---	---	---
2-1/2	VA-9072- 300	VA-9072- 300	---	---	---	---	---	---
3	VA-9072- 400	VA-9072- 300	---	---	---	---	---	---
4	VA-9072- 600	VA-9072- 400	VA-9075- 400	VA-9075- 400	VA-9075- 400	---	---	---
5	VA-9072- 600	VA-9072- 600	VA-9075- 600	VA-9075- 600	VA-9075- 600	---	---	---
6	VA-9072- 600	VA-9072- 600	VA-9075- 600	VA-9075- 600	VA-9075- 600	---	---	---
8	---	---	VA-9075- 800	VA-9075- 800	VA-9075- 800	VA-9078- 800	VA-9078- 800	VA-9078- 800
10	---	---	VA-9075- 1200	VA-9075- 1200	VA-9075- 1200	VA-9078- 1200	VA-9078- 1200	VA-9078- 1200
12	---	---	VA-9075- 1200	VA-9075- 1200	VA-9075- 1200	VA-9078- 1200	VA-9078- 1200	VA-9078- 1200
14	---	---	---	---	---	VA-9078- 1600	VA-9078- 1600	VA-9078- 1600
16	---	---	---	---	---	VA-9078- 1600	VA-9078- 1600	VA-9078- 1600
18	---	---	---	---	---	VA-9078- 2000	VA-9078- 2000	VA-9078- 2000

Technical Data*

Product	VF Series Standard-Pressure, Standard-Temperature Butterfly Valves	
Service	Hot Water, Chilled Water, Condenser Water (Not designed for use in steam applications.)	
Models and Ordering Data	Refer to Tables 1 through 11.	
Body Styles and Sizes	2 through 12 in.	Fully Lugged, Two-Way and Three-Way
	14 through 20 in.	Fully Lugged, Two-Way Only
Maximum Fluid Temperature	250°F (121°C)	
Maximum Closeoff Pressure (Refer to Table 1.)	2 through 12 in. Type "H"	175 psig (1,206 kPa) Bidirectional; 75 psig (517 kPa) Dead-End Service
	14 through 20 in. Type "H"	150 psig (1,034 kPa) Bidirectional; 75 psig (517 kPa) Dead-End Service
	4 through 20 in. Type "L"	50 psig (345 kPa) Bidirectional
Maximum Fluid Velocity	30 ft/Second (9 m/Second)	
Flow Characteristics	Modified Equal Percentage (Refer to Figure 13.)	
Flow Coefficients (Cv)	Refer to Table 30.	
Torque Requirements	Refer to Table 31.	
Materials	Body	Cast Iron, Red Epoxy Finish
	Tee (Three-Way Valves Only)	Cast Iron
	Disc	Ductile Iron Coated with Nylon 11
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel (2 through 12 in.) 304 Stainless Steel (14 through 20 in.)
Ambient Storage Temperature Limits	-20 to 150°F (-29 to 66°C); Preferably 40 to 85°F (4 to 29°C)	
Accessories (Order Separately)	Ten-Position Manual Handles (Refer to Table 14.) Gear-Operated Manual Hand Wheels (Refer to Table 15.)	
Representative Maximum Valve and Actuator Assembly Shipping Weights	Refer to Table 13.	

* For actuator applications, refer to the *Valve Actuators* section and/or the appropriate actuator product bulletin.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.



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