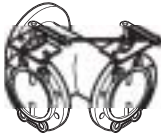
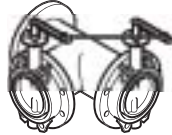


# 3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

**TABLE 1.** Select **Valve Assembly** with correct Input Signal (refer to Table 3, Table 3A, and Table 3B also) less **Actuator Code (XXX)** including the **P Code** (Size, Cv Rating, Port Code). (Refer to Pages 846 to 853 for Valve Sizing.)

			Application	
			Chilled or Hot Water	
			Flangeless Wafer <sup>a</sup>	2 in. - 6 in. Lug 8 in. - 12 in. Wafer
				
Size			2 to 24 in.	2 to 12 in.
Actuator	Normal Position	Input Signal	Valve Assemblies	
<b>MC-431</b>	None	SPDT	VC-6664-113-2-P	VC-6764-113-2-P
<b>MK4-7121</b>	Normal Position; Specify When Ordered	Pneumatic	VK-6664-221-2-P	VK-6764-221-2-P
<b>MK4-7121 and MK-7121</b>		Pneumatic	VK-6664-321-2-P	VK-6764-321-2-P
<b>MP-485</b>	None	Electric (Refer to Table 3B)	VP-6664-103-2-P	VP-6764-103-2-P
<b>MP-9750</b>	None		VP-6665-906-2-P	VP-6765-906-2-P
<b>MP-9810</b>	None		VP-6665-908-2-P	VP-6765-908-2-P
<b>MP-4851</b>	None	(Refer to Table 3B)	VP-6664-442-2-P VP-6665-442-2-P	VP-6764-442-2-P VP-6765-442-2-P

**NOTE:** These charts are color coded as shown below to assist valve selection. Note it is possible to select a valve assembly.

**ORDERING EXAMPLES:**

**1. Valve Assembly:**

**VK-6764-221-2-12**

□ **Valve Assembly** less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)

□ **P Code** (Size, Cv Rating, Port Code)

□ **Actuator Code (XXX)** for Valve Assemblies

Flow Type		Mixing or Diverting; Specify When Ordered	
<b>Material</b>	<b>Body</b>	Iron	Iron
	<b>Seat</b>	1.5 to 3% Leakage	EPDM (EPT) Rubber Liner
	<b>Stem</b>	Stainless Steel	Stainless Steel
	<b>Packing</b>	Graphited Teflon	"O" Ring
	<b>Disc</b>	Iron	Aluminum Bronze
WATER			
<b>Pressure psig (kPa)</b>	<b>Static</b>	125 (862)	125 (862)
	<b>Recommended Differential</b>	Refer to Table 2	
<b>Fluid Temp. °F (°C)</b>	<b>Minimum</b>	-10 (-23)	-10 (-23)
	<b>Maximum</b>	350 (177)	250 (121)

**TO SELECT A PORT CODE (P).**

P Code	Valve Size <sup>b</sup> (in.)	Cv <sup>c</sup>	
-11	2	49	63
-12	2-1/2	84	78
-13	3	132	133
-14	4	257	270
-15	5	429	525
-16	6	632	820
-17	8	1125	1320
-18	10	1758	1900
-19	12	2533	2850
-20	14	3035	—
-21	16	4118	—
-22	18	5279	—
-23	20	6584	—
-24	24	9626	—

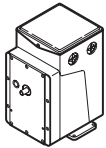
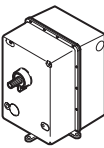

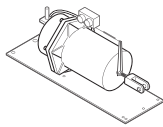
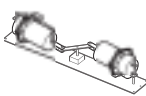
<sup>a</sup> Two flangeless wafers with 125/150 lb ASA flanges mounted on 125 lb cast iron tee. Refer to dimensional drawings.

<sup>b</sup> CAUTION: Fittings and/or pipe schedules must meet or exceed working static pressure requirements.

<sup>c</sup> Based on 60° opening for optimum control characteristics.

# 3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

**TABLE 2.** Select **Actuator Type** or **Actuator Code (XXX)** series with correct Input Signal having sufficient close-off for the application.

													
<b>Actuator Actuator Code (XXX)</b>			<b>MC-431 (113) MP-485 (103) MP-4851 (442)</b>	<b>MP-9750 (906)</b>	<b>MP-9810 (908)</b>	<b>MK4-7121 (221)<sup>a</sup></b>	<b>MK4-7121 and MK-7121 (321)<sup>a</sup></b>						
<b>Valve Assemblies</b>	<b>P Code</b>	<b>Size (in.)</b>	<b>Close-Off 0°</b>	<b>Max. Recom. Diff. Press. Full Open (60°) (psi)</b>	<b>Close-Off 0°</b>	<b>Max. Recom. Diff. Press. Full Open (60°) (psi)</b>	<b>Close-Off 0°</b>	<b>Max. Recom. Diff. Press. Full Open (60°) (psi)</b>	<b>Close-Off 0°</b>	<b>Max. Recom. Diff. Press. Full Open (60°) (psi)</b>	<b>Close-Off 0°</b>	<b>Max. Recom. Diff. Press. Full Open (60°) (psi)</b>	
VC-6664-113-2-P VK-6664-221-2-P VK-6664-321-2-P VP-6664-103-2-P VP-6665-906-2-P VP-6665-908-2-P VP-6665-442-2-P	-11	2	150	3.8 <sup>b</sup>	—	—	—	—	150	3.8 <sup>b</sup>	—	—	
	-12	2-1/2		2.5 <sup>b</sup>	—	—	—	—		2.5 <sup>b</sup>	—	—	
	-13	3		2.2 <sup>b</sup>	—	—	—	—		2.2 <sup>b</sup>	—	—	
	-14	4	125	100	2.1 <sup>b</sup>	—	—	—	125	100	2.1 <sup>b</sup>	—	—
	-15	5	2.0 <sup>b</sup>		80	2.0 <sup>b</sup>	80	2.0 <sup>b</sup>	80		2.0 <sup>b</sup>	—	—
	-16	6	50	2.0 <sup>b</sup>	80	2.0 <sup>b</sup>	80	2.0 <sup>b</sup>	80	2.0 <sup>b</sup>	—	—	
	-17	8	30	1.9 <sup>b</sup>	90	2.0 <sup>b</sup>	90	1.9 <sup>b</sup>	83	1.9 <sup>b</sup>	90	1.9 <sup>b</sup>	
	-18	10	25	1.4 <sup>b</sup>	70	1.9 <sup>b</sup>	70	2.0 <sup>b</sup>	36	2.0 <sup>b</sup>	70	2.0 <sup>b</sup>	
	-19	12	15	0.9 <sup>b</sup>	50	1.9 <sup>b</sup>	50	1.9 <sup>b</sup>	27	1.9 <sup>b</sup>	50	1.9 <sup>b</sup>	
	-20	14	—	30	—	1.9 <sup>b</sup>	30	2.0 <sup>b</sup>	16	1.8	30	2.0 <sup>b</sup>	
	-21	16	—		1.6 <sup>b</sup>	40	1.9 <sup>b</sup>	13	1.3	27			
	-22	18	—	20	1 <sup>b</sup>	30	1.7	—	—	17	1.6		
-23	20	—	15	0.8 <sup>b</sup>	25	1.3	—	—	13	1.3			
-24	24	—	10	0.5 <sup>b</sup>	15	0.7	—	—	8	0.7			
VC-6764-113-2-P VK-6764-221-2-P VK-6764-321-2-P VP-6764-103-2-P VP-6765-906-2-P VP-6765-908-2-P	-11	2	50 <sup>c</sup>	2.8 <sup>b</sup>	—	—	—	—	50 <sup>c</sup>	5.0 <sup>b</sup>	—	—	
	-12	2-1/2		3.7 <sup>b</sup>	—	—	—	—		3.5 <sup>b</sup>	—	—	
	-13	3		3.0 <sup>b</sup>	—	—	—	—		2.8 <sup>b</sup>	—	—	
	-14	4		2.2 <sup>b</sup>	—	—	—	—		2.5 <sup>b</sup>	—	—	
	-15	5	1.4 <sup>c d</sup>	50 <sup>c</sup>	2.2 <sup>b</sup>	—	—	—	—	—	—	—	
	-16	6	—		1.4 <sup>b</sup>	50 <sup>c</sup>	1.4 <sup>b</sup>	—	—	—	—	—	
	-17	8	—		1.3 <sup>b</sup>		1.3 <sup>b</sup>	—	—	50 <sup>c</sup>	2.3 <sup>b</sup>	1.7 <sup>b</sup>	
	-18	10	—	—	—	—	—	—	—	—	—		
	-19	12	—	—	—	—	—	—	—	—	Consult Factory		

- <sup>a</sup> Ratings based on 20 psi main pressure in actuator.
- <sup>b</sup> Based on 10 ft/sec. fluid velocity. Contact factory concerning higher rating.
- <sup>c</sup> Bubble tight.
- <sup>d</sup> Based on wet service application only.

**TABLE 3.** Factory Assemblies (VK-6X64), Pneumatic Input, select exact **Actuator Code (XXX)**.

<b>Input Signal</b>	<b>Normal Position</b>	<b>Effective Area</b>	<b>Spring Range (psig)</b>	<b>Positive Positioner</b>	<b>Actuator(s)</b>	<b>Actuator Code (XXX) for Factory Available Assembly</b>
Pneumatic	Specify When Ordered	20 sq. in.	8 to 13	Yes	MK4-7121	221
		40 sq. in.			MK4-7121 and MK-7121	321

**TABLE 3A.** Factory Assemblies (VC-6X64), SPDT (Snap Acting) Input, select exact **Actuator Code (XXX)**.

<b>Input Signal</b>	<b>Normal Position</b>	<b>Voltage Vac</b>	<b>Hz</b>	<b>VA</b>	<b>Auxiliary Switch</b>	<b>Actuator</b>	<b>Actuator Code (XXX) for Factory Available Assembly</b>
SPDT Snap Acting	None	120	60	96	Yes	MC-431	113

# 3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

**TABLE 3B.** Factory Assemblies (VP-6X6X and VS-6X64), Multiple Input (refer to table below), select exact **Actuator Code (XXX)**. Any 220 lb-in. MP-3XX, MP-4XX, or MP-9XXX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Normal Position	Input Signal							Voltage Vac (Hz)	Aux. Switch	Actuator Part Number	Actuator Code (XXX) for Factory Avail. Assem.
	2 to 15 Vdc System 8000	4 to 20 mA etc.	Slidewire (Series 90)	SPST	SPDT Snap Acting	Pneumatic	SPDT Floating Direct Digital Control				
None	1	2, 8	3	—	Yes	4, 9	Yes	120 (60)	Yes	MP-485	103
	6	2	7			4				MP-9750	906
						MP-9810				908	

1. Requires CP-8301-120 or CP-930X ordered separately.
2. Requires CP-8391-716 or CP-9302 ordered separately.
3. Requires AE-504 ordered separately.
4. Requires CP-8391-716 or CP-9302 and PP-8311.
6. Requires CP-8391-456 or CP-930X ordered separately.
7. Requires AE-504 and AM-345 ordered separately.
10. Requires CP-8391-910 or CP-9302 ordered separately.
11. Requires CP-8391-910 or CP-9302 and PP-8311 ordered separately.

**TABLE 4.** Optional Input Signal Interface to Pneumatic.

Input Signal Type	Interface Module Required
Two-Position SPST (Electric)	AL-1XX
Two-Position SPDT Snap Acting (Electric)	AL-1XX
Voltage 2 to 15 Vdc System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

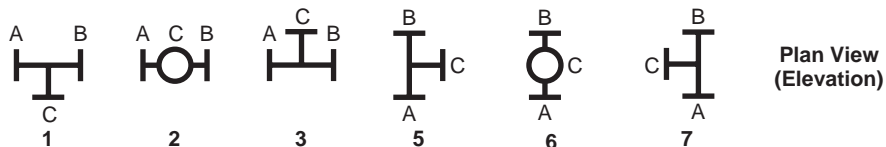
**TABLE 5.** Dimensions in Inches (Millimeters). (Refer to following pages for illustrations.)

Part Number	Size	Dimensions (in.)					
		Valve				Tee (3-Way)	
		A	B	C	D	E	F
VC-6664 VK-6664 VP-6664 VP-6665	2	1-1/2 (38)	2-3/4 (70)	5-3/8 (137)	3-7/8 (98)	4-1/2 (114)	5-1/8 (130)
	2-1/2		3 (76)	5-5/8 (143)	4-5/8 (118)	5 (127)	
	3		3-1/8 (79)	5-7/8 (149)	5-1/4 (133)	5-1/2 (140)	
	4		4-1/4 (108)	6-3/8 (162)	6-3/8 (162)	6-1/2 (165)	
	5		4-7/8 (129)	6-7/8 (175)	7-1/2 (191)	7-1/2 (191)	
	6	5-3/8 (137)	7-3/8 (187)	8-1/2 (216)	8 (203)	5-3/4 (146)	
	8	6-1/2 (165)	9-5/8 (244)	10-3/4 (273)	9 (229)		
	10	8 (203)	10-5/8 (270)	13 (330)	11 (279)		
	12	9-1/2 (241)	11-5/8 (295)	15-1/4 (387)	12 (309)		
	14	10-1/2 (267)	12-1/8 (308)	16-3/8 (416)	14 (356)		
	16	12-3/4 (324)	14-1/2 (368)	18-1/4 (464)	15 (381)	—	
	18	13-7/8 (352)	15-1/2 (394)	20-3/4 (527)	16-1/2 (419)		
	20	14-7/8 (378)	16-1/2 (419)	22-3/4 (578)	18 (457)		
	24	17-1/4 (438)	18-1/2 (470)	27 (686)	22 (559)		
VC-6764 VK-6764 VP-6764 VP-6765	2	1-5/8 (41)	2-7/8 (73)	5-3/4 (146)	6-1/8 (156)		4-1/2 (114)
	2-1/2	1-3/4 (45)	3-1/8 (79)	6-1/4 (159)	6-7/8 (175)	5 (127)	
	3		3-1/2 (89)	6-1/2 (165)	7-1/4 (184)	5-1/2 (140)	
	4	2 (51)	4-1/2 (114)	7-1/4 (184)	8-3/4 (222)	6-1/2 (165)	
	5	2-1/8 (54)	5-5/8 (143)	7-3/4 (197)	9-7/8 (251)	7-1/2 (191)	
	6		6-1/4 (159)	8-3/4 (222)	11 (279)	8 (203)	
	8		7-7/8 (200)	9-5/8 (245)	12 (305)	9 (229)	
	10	2-3/4 (70)	9-1/4 (235)	11 (279)	14-1/2 (368)	11 (279)	
	12	3 (76)	10-5/8 (270)	12-1/2 (318)	16-1/8 (410)	12 (309)	

# 3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

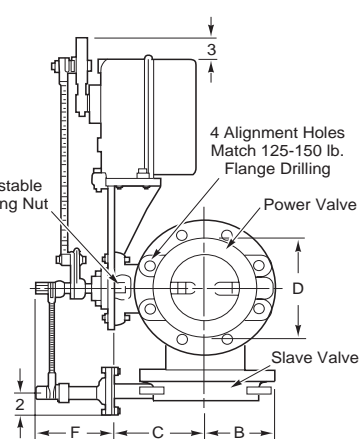
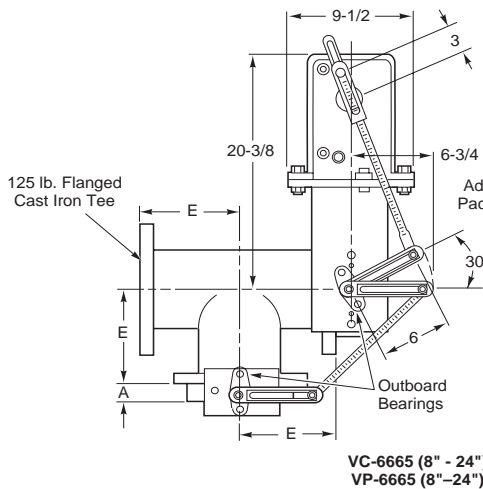
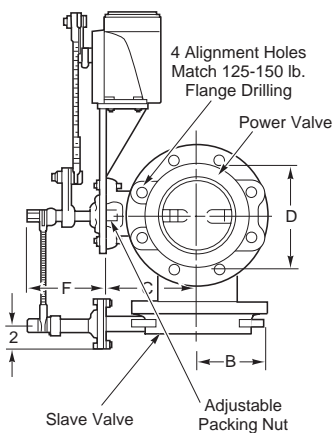
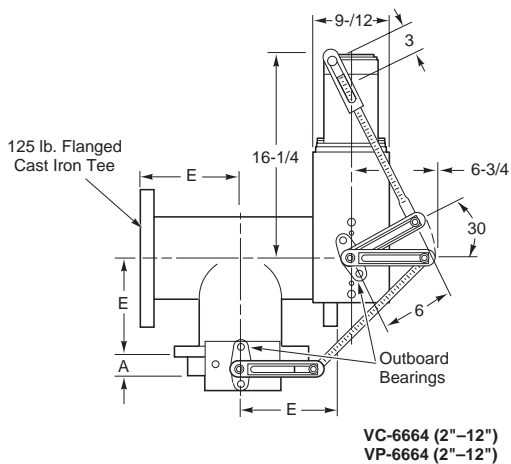
The 3-Way Assemblies are shipped as a complete unit, assembled, mounted and tested, fully ready for field installation. Two valves are mounted on a 125 lb. cast iron tee; one valve complete with power actuator, the second valve controlled through connecting slave linkage. The valves are linked so that as one valve opens, the other

valve closes. The tee arrangement desired should be specified by indicating the appropriate tee position (1 through 7 below), and the placement of both the power valve and slave valve respectively as on:



**Tee Selection Numbers**  
(1, 2, 3, 4, 5, 6, 7)

- 1.) Each port on Tee is designated by A, B, or C.
  - 2.) All Tee arrangement numbers are based on Plan View of the Tee (Elevation: Looking down on Tee and Top of valve shaft as shown in example below).
  - 3.) Power valve (valve with actuator) is designated by the first letter after the Tee Selection Number. Either A, B, or C.
  - 4.) All Tee arrangements are based on the bracket for the power valve to be positioned at 12:00 O'clock in the Plan View.
- As an example, the plan view shown below are tee arrangements: 1 B C.



# 3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

illustrations

