

**VCB Series**  
**Characterized Ball Valves**  
**2-Way & 3-Way**



**FEATURES & BENEFITS**

Characterized Insert	<ul style="list-style-type: none"> <li>• Establishes a flow coefficient (<math>C_v</math>) similar to globe valves, eliminating the need for pipe size correction tables when sizing valves.</li> <li>• Provides superior rangeability and equal percentage flow characteristic.</li> </ul>
Low Torque	<ul style="list-style-type: none"> <li>• Facilitates the use of smaller, less expensive actuators.</li> <li>• Extends valve and actuator service life.</li> </ul>
3-Way Body	<ul style="list-style-type: none"> <li>• “T” design simplifies 3-way piping.</li> <li>• Same valve used for mixing or diverting.</li> <li>• Allows for 3-way ball valves to retrofit globe valves.</li> </ul>
Universal Mounting	<ul style="list-style-type: none"> <li>• Accommodates virtually any direct-mount, rotary-motion actuator.</li> </ul>

Bray Controls is proud to offer the VCB Series of electrically automated characterized ball valves designed specifically for the HVAC market.

Bray’s high quality automated ball valves combine the performance of globe valves with the economy of ball valves – providing the best of both worlds. The VCB Series ball valves are equipped with a patented characterized insert in the ball. This characterized ball design provides very high rangeability and excellent equal percentage flow characteristics.

The Series VCB valves are ideal for all automatic temperature control applications using hot water, or chilled water.

Bray’s VCB valves can be equipped with a variety of economical electric actuators. Choices include on/off, 3-wire floating and proportional control models in both spring return and non-spring return styles.

The CA Series electric actuators feature simplified mounting of the actuator to a direct coupled bracket. The result is a very low profile unit with flexibility of use as well as fast and easy maintenance. All actuators include a manual override lever for manually positioning the valve when the actuator is not powered.

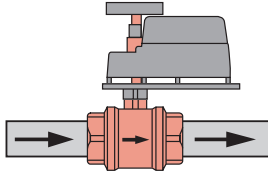
For additional information on Bray electric actuators, see the Actuators section of the Bray Commercial Product Manual.



*Patented insert characterizes flow for an equal percentage flow characteristic.*

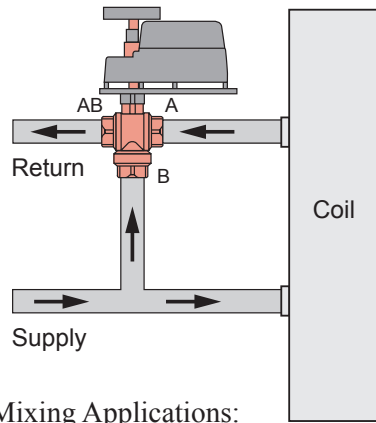
## PIPING DIAGRAMS

### 2-WAY



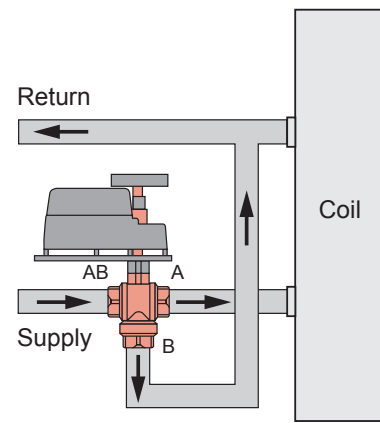
3-Way Valve Assemblies are shipped as standard with ball ports labeled as A, B, and AB. All 3-Way ball valves are shipped A open to AB at 0 VDC. For applications requiring a different flow pattern, please consult your Bray representative.

### 3-WAY MIXING



Mixing Applications:  
 Fluid enters through two inlets (A, B) and exits through one outlet (AB).  
 A is service port.  
 B is bypass port.

### 3-WAY DIVERTING



Diverting Applications:  
 Fluid enters through one inlet (AB) and exits through two outlets (A, B).  
 A is service port.  
 B is bypass port.

## SPECIFICATIONS

Series Identification	VCB Series Characterized Ball Valves
Body Pressure	360 psi (25 bar), meets or exceeds pressure and rating temperature requirements of ANSI Class 250
Size Range	1/2" to 3" (15 to 76 mm)
End Connections	Female NPT or BSPP
Temperature Range	-22°F to 240°F (-30°C to 115°C) at 360 psi for fluids
Service	Hot Water and Chilled Water, up to 50% Glycol
Flow Characteristic	Equal Percentage (Linear on bypass port of 3-way valve)
Seat Leakage	Meets ANSI Class IV (0.01% of $C_v$ )
Stroke	90°
Closeoff Pressure	Refer to chart on page 3
Rangeability	Refer to chart on page 3
Materials of Construction	Body: Forged Brass Ball: Nickel Plated Brass (Stainless Steel Optional) Stem: Brass (Stainless Steel Optional) Characterized Insert: Glass-Filled Polymer Stem Seal: EPDM O-rings (2) Ball Seals: RTFE seats with EPDM O-rings Mounting Bracket: Glass-Filled Polymer

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

## 2-WAY CHARACTERIZED BALL VALVE SELECTION TABLE

Connection		Model #			Rangeability		Ball Size		Close-off ΔP*		
in.	mm		Threads	Trim	C <sub>v</sub>	K <sub>v</sub>	in.	mm	PSI	kPa	
1/2	15	VCB2101	N=NPT B=BSP	1=Brass 2=Stainless	0.38	0.33	41:1	1/2	15	130	896
		VCB2102			0.68	0.59	17:1				
		VCB2103			1.3	1.1	52:1				
		VCB2104			2.6	2.2	321:1				
		VCB2105			4.7	4.1	159:1				
		•VCB2106			11.7	10.1	251:1				
3/4	20	VCB2207			2.5	2.2	321:1	1/2	15		
		VCB2208			4.3	3.7	159:1				
		•VCB2209			14.7	12.7	251:1	3/4	20		
		VCB2210			10.1	8.7	390:1				
1	25	VCB2311			9.0	7.8	390:1	3/4	20		
		•VCB2312			28.4	24.6	1503:1				
		VCB2313			15.3	13.2	1040:1				
1-1/4	32	VCB2414			14.9	12.9	1040:1	1	25		
		•VCB2415			41.1	35.6	1207:1				
		VCB2416			36.5	31.6	484:1				
1-1/2	40	VCB2517			22.8	19.6	484:1	1-1/4	32		
		•VCB2518			73.9	63.6	1263:1				
		VCB2519			41.3	35.5	603:1	1-1/2	40		
		VCB2620			41.7	35.9	603:1				
2	50	•VCB2621			108	92.9	558:1	1-1/2	40		
		VCB2622			71.1	61.5	287:1				
		VCB2723			55	47.6	N/A				
2-1/2	65	VCB2724			72	62.3	287:1	2	50		
		•VCB2725	202	173.7	N/A						
		VCB2826	82	70.5	558:1						
3	75	VCB2827	124	106.6	750:1	2	50				
		•VCB2828	145	124.7	877:1						

• Full port without characterized insert.

Example: 1" Valve, C<sub>v</sub>=9, NPT Threads, Brass Trim = VCB2311N1/Actuator

## 3-WAY CHARACTERIZED BALL VALVE SELECTION TABLE

Connection		Model #			Rangeability	Bypass Flow		Close-off ΔP*	
in.	mm		C <sub>v</sub>	K <sub>v</sub>		C <sub>v</sub>	K <sub>v</sub>	PSI	kPa
1/2	15	VCB3101*	.59	0.51	17:1	.47	.41	50	345
		VCB3102_	1.0	0.87	52:1	.80	.69		
		VCB3103_	2.4	2.1	321:1	1.9	1.7		
		VCB3104_	4.3	3.7	159:1	3.4	3.0		
		VCB3105_	8.0	6.9	251:1	6.4	5.5		
3/4	20	VCB3207_	2.4	2.1	321:1	1.9	1.7		
		VCB3208_	3.8	3.3	159:1	3.0	2.6		
		•VCB3209_	11	9.5	251:1	8.8	7.6		
1	25	VCB3311_	8.6	7.4	390:1	6.9	6.0		
		VCB3312_	22.3	19.3	1503:1	17.8	15.4		
1-1/4	32	VCB3414_	12.7	11	1040:1	10.2	8.8	40	276
		•VCB3415_	34.1	29.5	1207:1	27.3	23.6		
1-1/2	40	VCB3517_	23.5	20.3	484:1	18.8	16.3		
		VCB3518_	61.1	52.9	1263:1	48.9	42.3		
2	50	VCB3620_	38.2	33	603:1	30.6	26.4		
		VCB3621_	108.5	93.9	558:1	86.8	75.1		
2-1/2	65	VCB3722_	74.1	64.1	287:1	59.3	51.3		
		•VCB3723_	99.5	86.1	558:1	79.6	68.9		

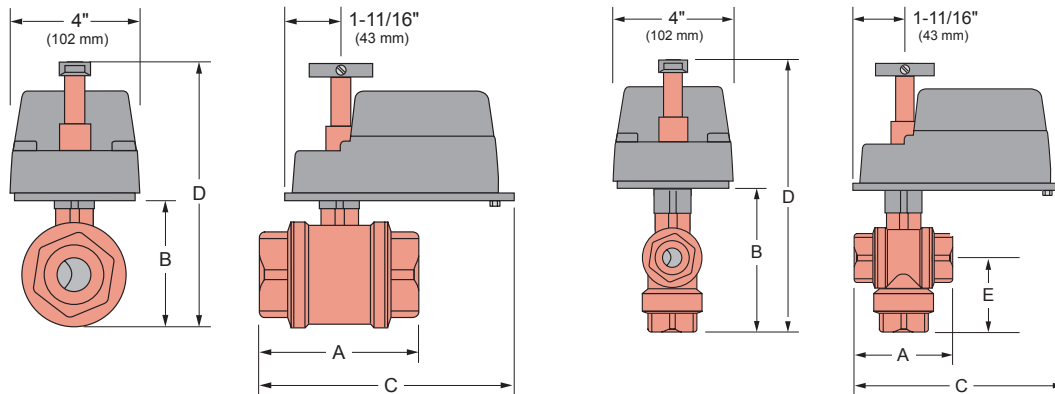
• Full port without characterized insert. \* N=NPT, B=BSP

Example: 2" Valve, C<sub>v</sub>=38.2, NPT Threads, Brass Trim = VCB3620NM/Actuator

\* Based on a minimum actuator torque of 35 in.-lb. (4 Nm)

## 2-WAY BALL VALVES

Connection		Model#	Ball Size		A		B		C*		D*		Weight	
in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lb	kg
1/2	15	VCB21__	1/2	13	2-3/8	60	2	51	6-5/8	168	6-3/16	157	1	0.5
3/4	20	VCB22__	1/2	13	2-7/16	62	2	51	6-5/8	168	6-3/16	157	1	0.5
			3/4	19	2-5/8	67	2-1/4	57	6-5/8	168	6-7/16	164	1	0.5
1	25	VCB23__	3/4	19	2-13/16	71	2-15/16	75	6-5/8	168	6-9/16	167	1	0.5
			1	25	3-1/16	78	3-1/8	79	6-5/8	168	6-3/4	171	1.4	0.6
1-1/4	32	VCB24__	1	25	3	76	3-3/16	81	6-5/8	168	6-13/16	173	1.4	0.6
			1-1/4	32	3-5/8	92	3-5/8	92	6-13/16	173	7-1/4	184	2.4	1.1
1-1/2	40	VCB25__	1-1/4	32	3-7/16	87	3-9/16	90	6-11/16	170	7-3/16	183	2.4	1.1
			1-1/2	38	4-1/16	103	4-5/16	110	7-1/16	179	7-15/16	202	3.2	1.5
2	50	VCB26__	1-1/2	38	3-15/16	100	4-5/16	110	7	178	7-15/16	202	3.2	1.5
			2	51	4-7/8	124	4-15/16	125	7-7/16	189	8-9/16	217	5	2.3
2-1/2	65	VCB27__	2	51	4-3/4	121	4-15/16	125	7-3/8	187	8-9/16	217	6.1	2.8
3	75	VCB28__	2	51	5-1/16	129	5	127	7-1/2	191	8-5/8	219	7	3.2



## 3-WAY BALL VALVES

Connection		Model#	A		B		C*		D*		E		Weight	
in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lb	kg
1/2	15	VCB310__	2-5/8	67	3-1/2	89	6-5/16	160	7-1/8	181	2	51	1.6	0.7
3/4	20	VCB320__	2-5/8	67	3-1/2	89	6-5/16	160	7-1/8	181	2	51	1.6	0.7
1	25	VCB331__	3	76	4-3/4	121	6-1/2	165	8-5/16	211	2-3/8	60	2.3	1.0
1-1/4	32	VCB341__	3-5/8	92	5-5/16	135	7-13/16	185	8-15/16	227	2-13/16	71	3.5	1.6
1-1/2	40	VCB351__	4	102	6-1/8	156	7	178	9-3/4	248	3-1/8	79	5.2	2.4
2	50	VCB3620	4	102	6	152	7	178	9-5/8	244	3-1/16	78	5.2	2.4
		VCB3621	4-7/8	124	7-1/8	181	7-7/16	189	10-3/4	273	3-7/8	98	8.5	3.9
2-1/2	65	VCB372__	4	102	5-11/16	144	7	178	6-5/16	168	3-7/16	87	9.1	4.1

\*Dimensions may vary, depending on the actuator. Dimensions shown are for the largest non spring return actuator available. Weights shown are for valve bodies only.

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 **Bray** CONTROLS  
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