

# *SoftTouch*



**1/2" - 3"**  
**Ball Valves**

Features  
ST Series 2-Way & 3-Way Assembly Features:

## SoftTouch Ball Valves

Applications for Building Automation, Temperature Controls, HVAC  
Two-Way and Three-Way Assemblies • Chilled Water • Hot Water

### Features and Benefits:

<b>Characterized Insert</b>	<ul style="list-style-type: none"> <li>• Provides superior rangeability and equal percentage flow characteristic.</li> <li>• Establishes a flow coefficient (Cv) similar to globe valves, eliminating the need for pipe size correction tables when sizing valves.</li> </ul>
<b>Low Torque</b>	<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>
<b>3-Way Body</b>	<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>
<b>Universal Mounting</b>	<ul style="list-style-type: none"> <li>• Accommodates virtually any direct-mount, rotary-motion actuator.</li> </ul>



Bray Controls is proud to offer the SoftTouch (ST) Series of electrically automated characterized ball valves designed specifically for the H.V.A.C. 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 ST 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 ST Series valves are ideal for all automatic temperature control applications using hot water, or chilled water.

Bray's SoftTouch 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 wide variety of 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 non-spring return 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.

**Low Torque Ball Valves**

ST Series Ball Valves shall be used in hot and chilled water applications where the water temperature does not exceed 250°F, fluid composition does not exceed 50% glycol, and maximum static pressure does not exceed 360 PSI. A ball valve that exhibits equal percentage flow characteristics throughout the 0-10VDC (0-20mA) control signal range shall be used.

**2-Way ST Series Ball Valves, (1/2" to 3")**

2-Way full-port and characterized valves shall feature circular, straight-through flow passages. The flow capacity of each valve is established by a parabolic port insert that is permanently press-fit into the ball. The insert shall be made of modified Polyphenylene Oxide and Polyphenylene Ether (NORYL®). The insert shall be fitted through the port inlet into the outlet. Separable characterizing discs shall not be accepted.

**3-Way ST Series Ball Valves, (1/2" to 2-1/2")**

"T" configured piping:

- When using a piping configuration similar to 3-Way globe valve piping ("T" configuration), a "T"-Shaped 3-Way ball valve shall be used.
- Ports shall be labeled "A", "B" and "AB". There shall be three characterized inserts, one in each port, in order to achieve equal percentage flow to the coil and linear flow to the bypass. The inserts shall be made of modified Polyphenylene Oxide and Ether (NORYL®). The inserts shall be fitted through the port inlet into the outlet.
- Full bypass flow capacity is not to exceed 80% of straight through flow capacity.
- 3-Way valves shall be used interchangeably for mixing or diverting applications.

Resilient, reinforced Teflon® seats shall be used to reduce the torque required to move the valve. Seats shall have a groove formed into the outer wall where a peroxide-cured EPDM O-ring is fitted, resulting in a single unit resilient seat assembly. Resilient seats that utilize separable components shall not be accepted.

A single-piece, leak-proof, stem fitted with one peroxide-cured EPDM O-ring and dual Teflon seals with wedge design shall be used on all ball valves.

**Actuators**

Actuators shall be assembled to the valves using a low-profile bracket that incorporates an anti-rotation stop pin to counteract the torque effect of valve actuation. Provisions shall be made to assemble the actuator in either of two positions in the horizontal plane relative to the valve.

Actuator shall provide minimum torque required for full valve shut-off position. Nominal torque requirement shall not exceed 70 lb. in. for up to 3 in. valve.

Characterized ball valves shall be provided by Bray Controls.

**ST VALVE HOUSING SPECIFICATIONS**

<b>Static Pressure/Temperature:</b>	360 PSI/-22°F to 250°F
<b>Service:</b>	Chilled Water, Hot Water, up to 50% Glycol
<b>Port:</b>	Glass Filled Polymer
<b>Body Material:</b>	Forged Brass ASTM B283
<b>End Connections:</b>	Brass
<b>Stem:</b>	Brass (also available in Stainless Steel)
<b>Stem Seals:</b>	EPDM O-Ring / Dual Teflon Seals - Wedge Design
<b>Ball Valve:</b>	Nickel Plated Brass Ball (2-Way also available in Stainless Steel)
<b>Ball Seals:</b>	Teflon seal with EPDM O-Rings
<b>Angle of Rotation:</b>	0-90 Degrees
<b>Leakage:</b>	ANSI Class IV (0.01% of Cv)

**Standard Valve Set-up and Notes:**

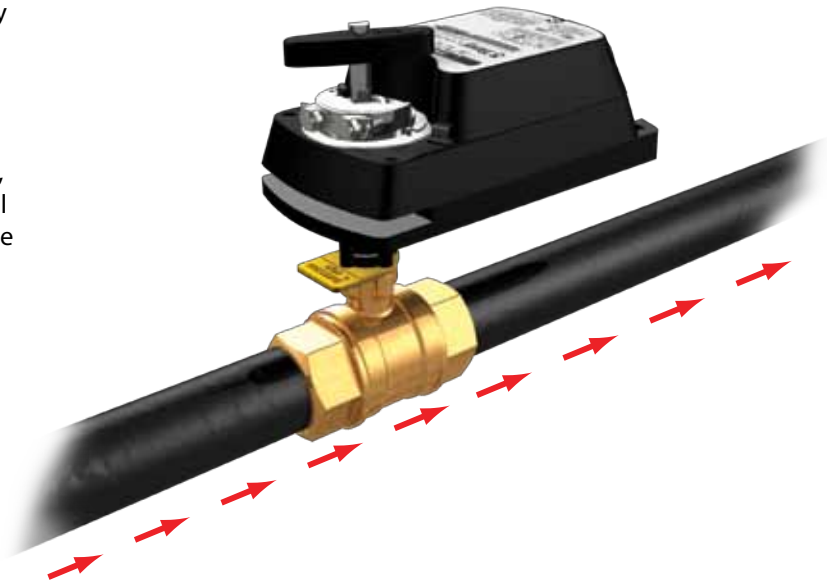
**2-WAY ASSEMBLIES:**

- 2-Way assemblies with non-spring return actuators are shipped normally closed, voltage rise to close (CW), unless otherwise specified.
- 2-Way assemblies with spring return actuators are shipped normally open, voltage rise (CW) to close, and will fail to the open position, unless otherwise specified.

*OPTIONAL SET-UPS*

2-Way assemblies with Spring Return actuators have the option of failing open or closed, please specify upon ordering.

**2-Way Piping Schematics**



**Standard Valve Set-up and Notes:**

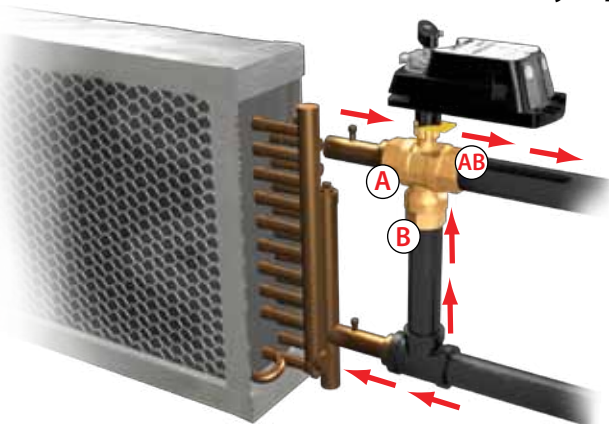
**3-WAY ASSEMBLIES:**

- 3-Way assemblies with non-spring return actuators are shipped with flow between A and AB (CCW) at 0VDC, and flow between B and AB at 10VDC (CW).
- 3-Way assemblies with spring return actuators are shipped with flow between A and AB (CCW) at 0 VDC, and flow between B and AB (CW) at 10VDC, and will fail with flow between A and AB, unless otherwise specified.

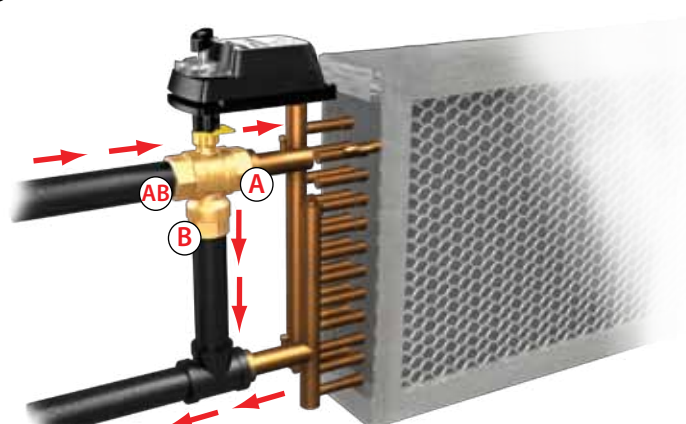
*OPTIONAL SET-UPS*

- 1) Flow from B to AB at 0VDC with flow from A to AB at 10VDC. Fail with flow from B to AB.
- 2) Flow from B to AB at 10VDC with flow from A to AB at 0VDC. Fail with flow from B to AB.
- 3) Flow from A to AB at 0VDC with flow from B to AB at 10VDC. Fail with flow from A to AB.

**3-Way Piping Schematics**



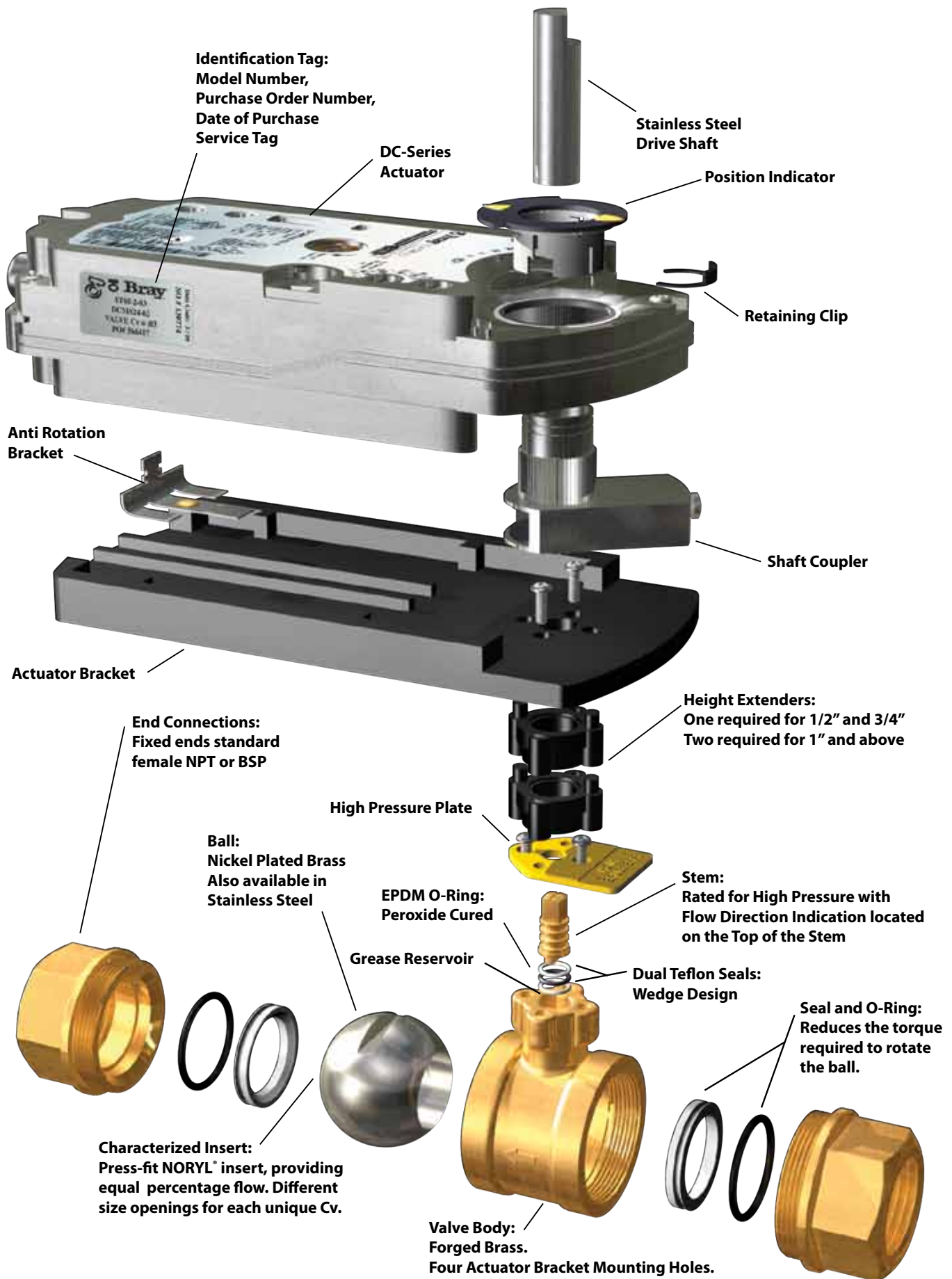
**Mixing Applications:**  
Fluid enters through two inlets (A, B) and exits through one outlet (AB).  
A is service port. B is bypass port.



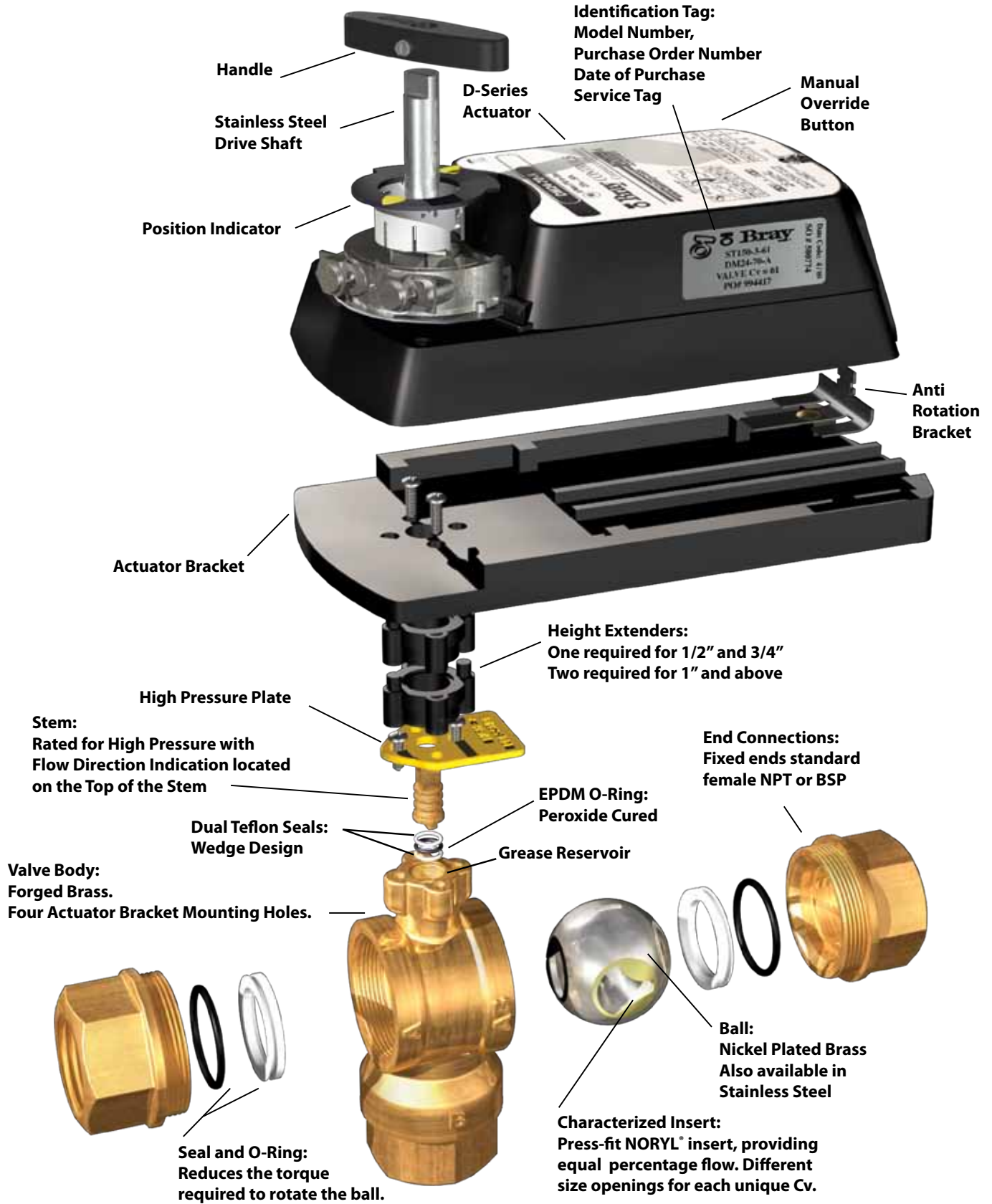
**Diverting Applications:**  
Fluid enters through one inlet (AB) and exits through two outlets (A, B).  
A is service port. B is bypass port.



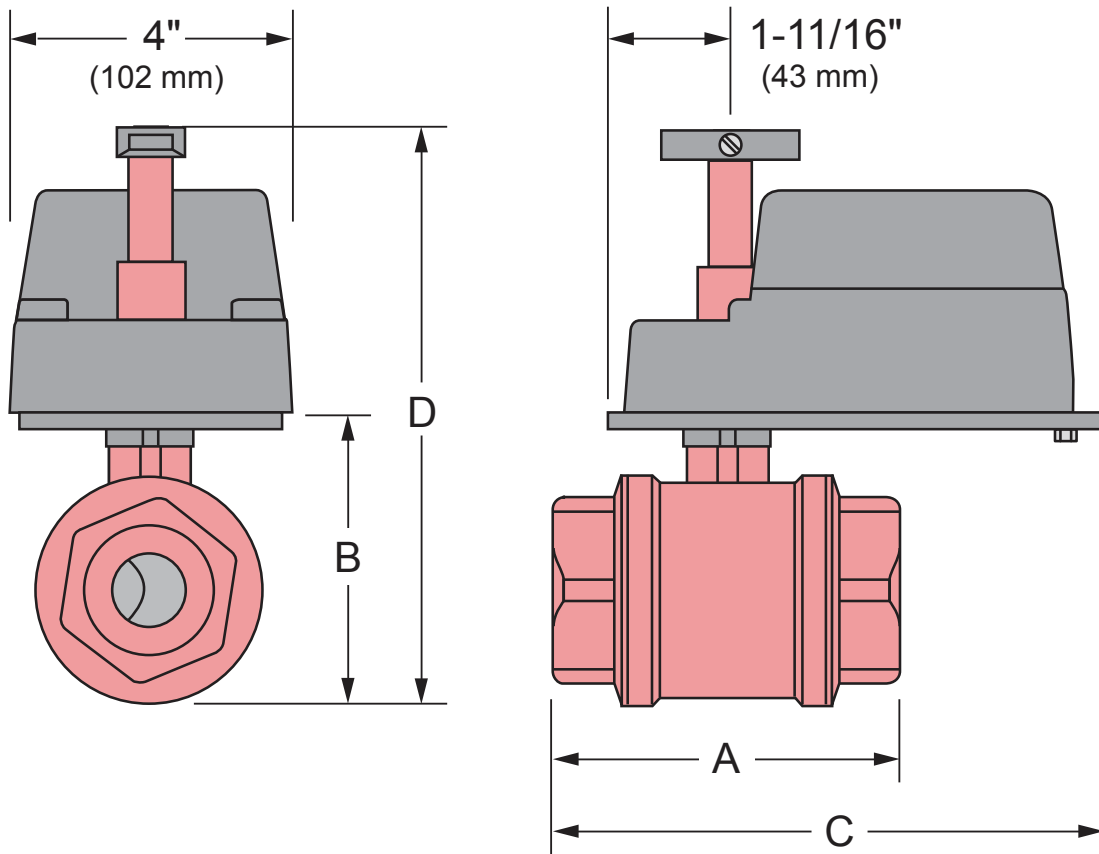
Exploded View  
2-Way ST Series Valve Assembly



# Exploded View 3-Way ST Series Valve Assembly



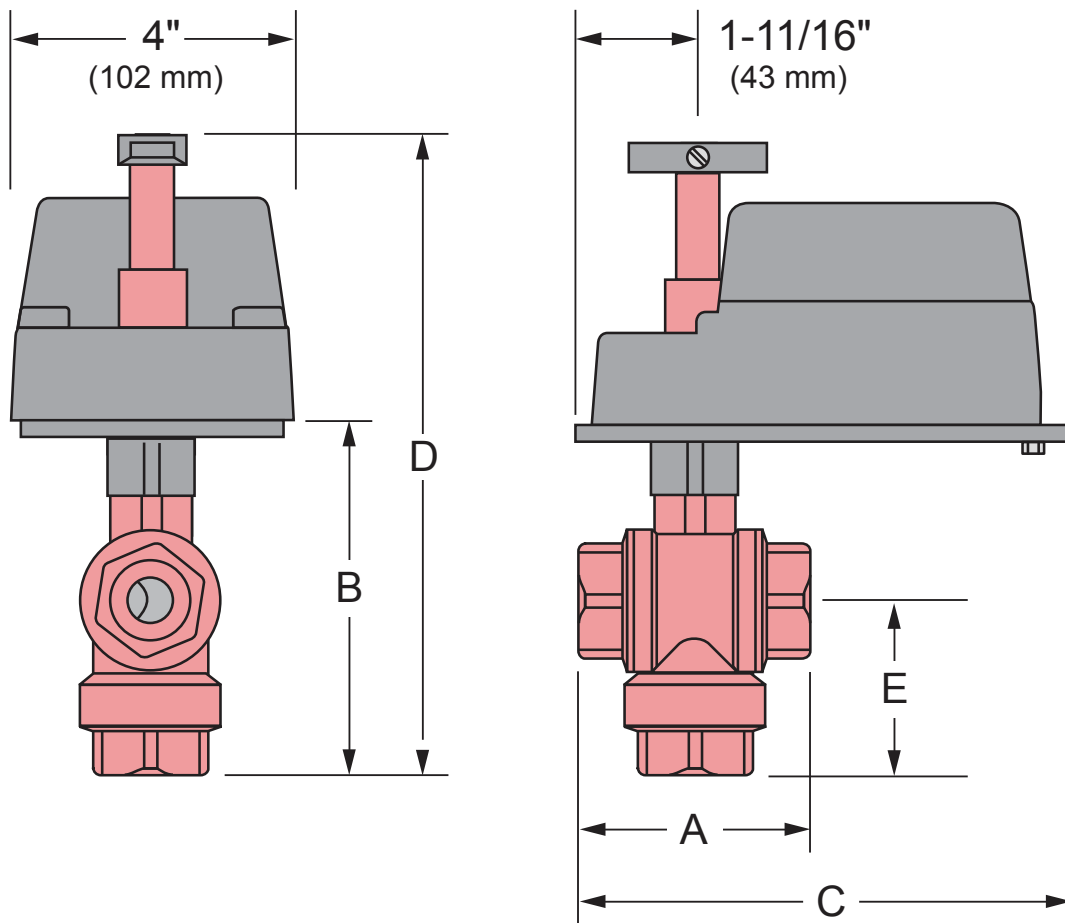
SoftTouch Ball Valves



2-WAY DIMENSIONS, 1/2" - 3"

ST VALVE MODEL # PREFIX ST Size-Way-Cv	Connection		Available Cv's	Please reference illustration above									
				A		B		C*		D*		Weight	
				in.	mm	in.	mm	in.	mm	in.	mm	lb	kg
ST 05-2-...	1/2	15	0.38, 0.68, 1.3, 2.6, 4.7, 11.7	2-3/8	60	2	51	6-5/8	168	6-3/16	157	1	0.5
ST 75-2-...	3/4	20	3, 4, 15	2-7/16	62	2	51	6-5/8	168	6-3/16	157	1	0.5
			10, 29	2-5/8	67	2-1/4	57	6-5/8	168	6-7/16	164	1	0.5
ST 1-2-...	1	25	9, 28	2-13/16	71	2-15/16	75	6-5/8	168	6-9/16	167	1	0.5
			15, 54	3-1/16	78	3-1/8	79	6-5/8	168	6-3/4	171	1.4	0.6
ST 125-2-...	1-1/4	32	15, 41	3	76	3-3/16	81	6-5/8	168	6-13/16	173	1.4	0.6
			37, 102	3-5/8	92	3-5/8	92	6-13/16	173	7-1/4	184	2.4	1.1
ST 150-2-...	1-1/2	40	23, 74	3-7/16	87	3-9/16	90	6-11/16	170	7-3/16	183	2.4	1.1
			41, 171	4-1/16	103	4-5/16	110	7-1/16	179	7-15/16	202	3.2	1.5
ST 2-2-...	2	50	42, 108	3-15/16	100	4-5/16	110	7	178	7-15/16	202	3.2	1.5
			71, 266	4-7/8	124	4-15/16	125	7-7/16	189	8-9/16	217	5	2.3
ST 250-2-...	2-1/2	65	55, 72, 100, 202	4-3/4	121	4-15/16	125	7-3/8	187	8-9/16	217	6.1	2.8
ST 3-2-...	3	75	63, 82, 124, 145	5-1/16	129	5	127	7-1/2	191	8-5/8	219	7	3.2

\* Dimensions may vary, depending on the actuator. Dimensions are shown for the largest spring return actuator currently available. Weights shown are for valve bodies only. Dimensions are shown in inches and are approximate. Please add 1" to column B if height extension is desired to accommodate extra insulation (DCP Series only)



### 3-WAY DIMENSIONS, 1/2" - 2-1/2"

ST VALVE MODEL # PREFIX ST Size-Way-Cv	Connection		Available Cv's	Please reference illustration above											
				A		B		C*		D*		E		Weight	
				in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lb	kg
ST 05-3-...	1/2	15	0.3, 0.6, 1.0, 2.4, 4.3, 8.0	2-5/8	67	3-1/2	89	6-5/16	160	7-1/8	181	2	51	1.6	0.7
ST 75-3-...	3/4	20	1, 2, 4, 11	2-7/16	62	2	51	6-5/8	168	6-3/16	157	6-3/16	157	1.6	0.7
ST 1-3-...	1	25	9, 22	3	76	4-3/4	121	6-1/2	165	8-5/16	211	2-3/8	60	2.3	1.0
			15	4-1/2	114	7-3/8	188	7-3/4	198	10-7/8	277	3-1/4	84	3.6	1.6
ST 125-3-...	1-1/4	32	19	3	76	6-3/8	163	6-3/4	173	9-7/8	251	2-1/2	64	3.3	1.5
			13, 34	3-5/8	92	5-5/16	135	7-13/16	185	8-15/16	227	2-13/16	71	3.5	1.6
ST 150-3-...	1-1/2	40	13	4-1/2	114	7-3/8	188	7-3/4	198	10-7/8	277	3-1/4	84	3.6	1.6
			24, 61	4	102	6-1/8	156	7	178	9-3/4	248	3-1/8	79	5.2	2.4
ST 2-3-...	2	50	57	4	102	6	152	7	178	9-5/8	244	3-1/16	78	5.2	2.4
			38, 109	4-7/8	124	7-1/8	181	7-7/16	189	10-3/4	273	3-7/8	98	8.5	3.9
ST 250-3-...	2-1/2	65	74, 100	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 are shown for the largest spring return actuator currently available. Weights shown are for valve bodies only. Dimensions are shown in inches and are approximate.  
Please add 1" to column B if height extension is desired to accommodate extra insulation ( DCP Series only)



**VALVE SIZING STEPS**

**STEP ONE** Determine the designed Cv by using the following equation.

$$C_v = \frac{Q\sqrt{G}}{\sqrt{\Delta P}}$$

Where

**Q** = Flow in gallons per minute (GPM) required to pass through the valve

**G** = Specific gravity of fluid \*

**ΔP** = Designed pressure drop across the valve in PSI

**Cv** = Flow coefficient

**NOTES**

\* Specific gravity is negligible (equal to 1) for water below 200°F. Use actual specific gravity of pure fluids other than water. In most cases, the valve selected for a H<sub>2</sub>O mixture will not be affected by the specific gravity.

**EXAMPLE**

The Specific Gravity of 50% Water (Compound 1) and 50% Ethylene Glycol Solution (Compound 2):

$$\frac{1}{\text{Specific Gravity}} = \frac{0.5}{1.0} + \frac{0.5}{1.113} = 1.05$$

$$\frac{1}{G_{\text{soln}}} = \frac{\text{wt\% of Compound 1}}{\text{Specific Gravity (G)}} + \frac{\text{wt\% of Compound 2}}{\text{Specific Gravity (G)}}$$

**STEP TWO** Determine whether the valve should be line size or sized to match the designed pressure drop (typical for modulating applications where precise control is required.)

**OPTION 1**

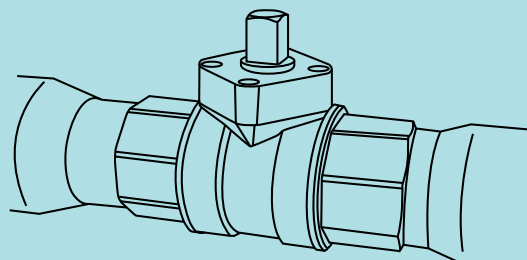
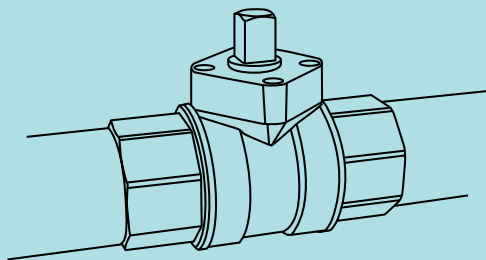
**LINE SIZE**

Go to page 10, ST Series Quick Reference Charts. Using the line size, find a valve of the same size with a Cv that best matches the one calculated in Step 1.

**OPTION 2**

**SIZE FOR PRECISE CONTROL**

Go to pages 11 & 12 (2-Way or 3-Way), ST Series Piping Geometry Charts. Find the line size at the top of the chart. Scan down the page to the Cv that best matches the one calculated in Step 1.



**STEP THREE** Determine the actual pressure drop using the below equation.

$$\Delta P = \left( \frac{Q\sqrt{G}}{C_v} \right)^2$$

If the pressure drop is acceptable†, go to Step 4.  
If not, repeat Steps 2 and 3, selecting an alternate valve.

**STEP FOUR** Check to be sure that the close-off requirements are met. Refer to Page 13 & 14.

† Recommended to be no higher than 35 PSI or match the designed pressure drop, 3, 4, 5, and 6 PSI are commonly accepted for modulating applications.

**2-WAY - GPM - Quick Reference Sizing Chart**

VALVE SIZE	MODEL NO.	FULL PORT	Cv* 1.0	DIFFERENTIAL PRESSURE (PSI)									
				1.5	2.0	2.5	3.0Δ	3.5Δ	4.0Δ	4.5Δ	5.0Δ	7.0	10.0
1/2"	ST 05-2-004		0.38	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.8	1.0	1.2
	ST 05-2-007		0.68	0.8	1.0	1.1	1.2	1.3	1.4	1.4	1.5	1.8	2.2
	ST 05-2-01		1.3	1.6	1.8	2.1	2.3	2.4	2.6	2.8	2.9	3.4	4.1
	ST 05-2-03		2.6	3.2	3.7	4.1	4.5	4.9	5.2	5.5	5.8	6.9	8.2
	ST 05-2-05		4.7	5.8	6.6	7.4	8.1	8.8	9.4	10.0	10.5	12.4	14.9
ST 05-2-12	●	11.7	14.3	16.5	18.5	20.3	21.9	23.4	24.8	26.2	31.0	37.0	
3/4"	ST 75-2-03		3	3.1	3.5	4.0	4.3	4.7	5.0	5.3	5.6	6.6	7.9
	ST 75-2-04		4	5.3	6.1	6.8	7.4	8.0	8.6	9.1	9.6	11.4	13.6
	ST 75-2-10		10	12.4	14.3	16.0	17.5	18.9	20.2	21.4	22.6	26.7	31.9
	ST 75-2-15	●	15	18.0	20.8	23.2	25.5	27.5	29.4	31.2	32.9	38.9	46.5
	ST 75-2-29	●	29	35.0	40.4	45.2	49.5	53.5	57.2	60.7	64.0	75.7	90.4
1"	ST 1-2-09		9	11.0	12.7	14.2	15.6	16.8	18.0	19.1	20.1	23.8	28.5
	ST 1-2-15		15	18.7	21.6	24.2	26.5	28.6	30.6	32.5	34.2	40.5	48.4
	ST 1-2-28		28	32.0	36.9	41.3	45.2	48.8	52.2	55.4	58.4	69.1	82.5
	ST 1-2-54	●	54	66.4	76.7	85.7	93.9	101.4	108.4	115.0	121.2	143.4	171.4
1-1/4"	ST 125-2-15		15	18.2	21.1	23.6	25.8	27.9	29.8	31.6	33.3	39.4	47.1
	ST 125-2-37		37	44.7	51.6	57.7	63.2	68.3	73.0	77.4	81.6	96.6	115.4
	ST 125-2-41	●	41	50.3	58.1	65.0	71.2	76.9	82.2	87.2	91.9	108.7	130.0
	ST 125-2-102	●	102	125.3	144.7	161.8	177.2	191.4	205	217	229	271	324
1-1/2"	ST 150-2-23		23	27.9	32.2	36.0	39.5	42.7	45.6	48.4	51.0	60.3	72.1
	ST 150-2-41		41	50.6	58.4	65.3	71.5	77.3	82.6	87.6	92.3	109.3	130.6
	ST 150-2-74	●	74	90.5	104.5	116.8	128.0	138.3	147.8	156.8	165.2	195.5	234
	ST 150-2-171	●	171	210	243	272	297	321	343	364	384	454	543
2"	ST 2-2-42		42	51.1	59.0	65.9	72.2	78.0	83.4	88.5	93.2	110.3	131.9
	ST 2-2-71		71	87.1	100.6	112.4	123.1	133.0	142.2	150.8	159.0	188.1	225
	ST 2-2-108		108	132.3	152.7	170.8	187.1	202.0	216.0	229.1	241.5	285.7	341.5
	ST 2-2-266	●	266	326	376	421	461	498	532	564	595	704	841
2-1/2"	ST 250-2-55		55	67.4	77.8	87.0	95.3	102.9	110.0	116.7	123.0	145.5	173.9
	ST 250-2-72		72	88.5	102.2	114.3	125.2	135.3	144.6	153.4	161.7	191.3	229
	ST 250-2-100		100	122.5	141.4	158.1	173.2	187.1	200	212	224	265	316
	ST 250-2-202	●	202	247	286	319	350	378	404	429	452	534	639
3"	ST 3-2-63		63	77.2	89.1	99.6	109.1	117.9	126.0	133.6	140.9	166.7	199.2
	ST 3-2-82		82	100.4	116.0	129.7	142.0	153.4	164.0	173.9	183.4	217	259
	ST 3-2-124		124	151.9	175.4	196.1	215	232	248	263	277	328	392
	ST 3-2-145	●	145	177.6	205	229	251	271	290	308	324	384	459

\* Cv is the gallons per minute of water that the valve will pass with 1 PSI pressure drop.  
 Δ 3-5 PSI is typically the preferred pressure drop in a modulating application.

**3-WAY - GPM - Quick Reference Sizing Chart**

VALVE SIZE	MODEL NO.	FULL PORT	Cv* 1.0	DIFFERENTIAL PRESSURE (PSI)									
				1.5	2.0	2.5	3.0Δ	3.5Δ	4.0Δ	4.5Δ	5.0Δ	7.0	10.0
1/2"	ST 05-3-003		0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.9	1.0
	ST 05-3-006		0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.6	1.9
	ST 05-3-01		1.0	1.2	1.4	1.6	1.7	1.9	2.0	2.1	2.2	2.6	3.2
	ST 05-3-02		2.4	2.9	3.4	3.8	4.2	4.5	4.8	5.1	5.4	6.3	7.6
	ST 05-3-04		4.3	5.3	6.1	6.8	7.4	8.0	8.6	9.1	9.6	11.4	13.6
	ST 05-3-08	●	8.0	9.8	11.3	12.6	13.9	15.0	16.0	17.0	17.9	21.2	25.3
3/4"	ST 75-3-01		1	1.6	1.8	2.1	2.3	2.4	2.6	2.8	2.9	3.4	4.1
	ST 75-3-02		2	2.9	3.4	3.8	4.2	4.5	4.8	5.1	5.4	6.3	7.6
	ST 75-3-04		4	4.7	5.4	6.0	6.6	7.1	7.6	8.1	8.5	10.1	12.0
1"	ST 75-3-11		11	13.5	15.6	17.4	19.1	20.6	22.0	23.3	24.6	29.1	34.8
	ST 1-3-09		9	10.5	12.1	13.6	14.9	16.1	17.2	18.2	19.2	22.7	27.2
	ST 1-3-15		15	18.2	21.1	23.6	25.8	27.9	29.8	31.6	33.3	39.4	47.1
1-1/4"	ST 1-3-22	●	22	27.3	31.5	35.3	38.6	41.7	44.6	47.3	49.9	59.0	70.5
	ST 125-3-13		13	15.6	18.0	20.1	22.0	23.8	25.4	26.9	28.4	33.6	40.2
	ST 125-3-19	●	19	23.8	27.4	30.7	33.6	36.3	38.8	41.2	43.4	51.3	61.3
1-1/2"	ST 125-3-34	●	34	41.8	48.2	53.9	59.1	63.8	68.2	72.3	76.2	90.2	107.8
	ST 150-3-13		13	16.4	18.9	21.1	23.2	25.0	26.7	28.4	29.9	35.4	42.3
	ST 150-3-24		24	28.8	33.3	37.2	40.8	44.0	47.1	49.9	52.6	62.3	74.4
2"	ST 150-3-61	●	61	74.8	86.4	96.6	105.8	114.3	122.2	129.6	136.6	161.6	193.2
	ST 2-3-38		38	46.8	54.0	60.4	66.2	71.5	76.4	81.0	85.4	101.1	120.8
	ST 2-3-57	●	57	69.4	80.2	89.7	98.2	106.1	113.4	120.3	126.8	150.1	179.3
2-1/2"	ST 2-3-109	●	109	132.9	153.4	171.6	187.9	203	217	230	243	287	343
	ST 250-3-74		74	90.8	104.8	117.2	128.3	138.6	148.2	157.2	165.7	196.1	234.3
	ST 250-3-100	●	100	121.9	140.7	157.3	172.3	186.1	199.0	211.1	222.5	263.3	314.6

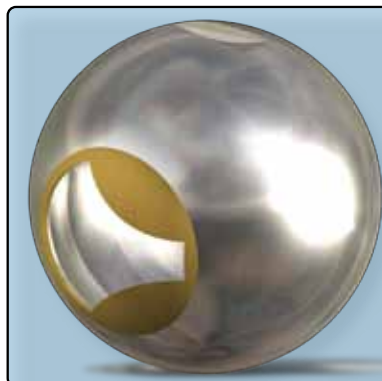
\* Cv is the gallons per minute of water that the valve will pass with 1 PSI pressure drop.  
 Δ 3-5 PSI is typically the preferred pressure drop in a modulating application.

## 2-WAY - PIPING GEOMETRY CHART - Adjusted Cv

Valve Size	Valve Model Number	Nominal Cv	Pipe Size								
			3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	5"
1/2"	ST 05-2-004	0.40	0.40	0.40	---	---	---	---	---	---	---
	ST 05-2-007	0.70	0.70	0.70	---	---	---	---	---	---	---
	ST 05-2-01	1.3	1.3	1.3	---	---	---	---	---	---	---
	ST 05-2-03	2.6	2.6	2.5	---	---	---	---	---	---	---
	ST 05-2-05	4.7	4.4	4.3	---	---	---	---	---	---	---
	ST 05-2-12	12	9.0	7.7	---	---	---	---	---	---	---
3/4"	ST 75-2-03	2.5	---	2.5	2.5	---	---	---	---	---	---
	ST 75-2-04	4.3	---	4.3	4.2	---	---	---	---	---	---
	ST 75-2-10	10	---	9.7	9.3	---	---	---	---	---	---
	ST 75-2-15	15	---	14.0	13.0	---	---	---	---	---	---
	ST 75-2-29	29	---	23.2	19.5	---	---	---	---	---	---
1"	ST 1-2-09	9	---	---	8.9	8.9	---	---	---	---	---
	ST 1-2-15	15	---	---	14.8	14.4	---	---	---	---	---
	ST 1-2-28	28	---	---	26.5	24.8	---	---	---	---	---
	ST 1-2-54	54	---	---	45.3	38.1	---	---	---	---	---
1-1/4"	ST 125-2-15	15	---	---	---	14.9	14.7	---	---	---	---
	ST 125-2-37	37	---	---	---	36.0	33.3	---	---	---	---
	ST 125-2-41	41	---	---	---	39.6	36.2	---	---	---	---
	ST 125-2-102	102	---	---	---	84.9	61.3	---	---	---	---
1-1/2"	ST 150-2-23	23	---	---	---	---	22.7	22.5	---	---	---
	ST 150-2-41	41	---	---	---	---	39.6	38.2	---	---	---
	ST 150-2-74	74	---	---	---	---	66.7	60.5	---	---	---
	ST 150-2-171	171	---	---	---	---	114.3	89.6	---	---	---
2"	ST 2-2-42	42	---	---	---	---	---	41.7	41.2	---	---
	ST 2-2-71	71	---	---	---	---	---	69.4	67.4	---	---
	ST 2-2-108	108	---	---	---	---	---	102.7	96.5	---	---
	ST 2-2-266	266	---	---	---	---	---	207.6	167.3	---	---
2-1/2"	ST 250-2-55	55	---	---	---	---	---	---	54.8	54.1	---
	ST 250-2-72	72	---	---	---	---	---	---	71.5	70.1	---
	ST 250-2-100	100	---	---	---	---	---	---	98.7	95.1	---
	ST 250-2-202	202	---	---	---	---	---	---	191.8	168.7	---
3"	ST 3-2-63	63	---	---	---	---	---	---	62.7	62.3	---
	ST 3-2-82	82	---	---	---	---	---	---	81.3	80.5	---
	ST 3-2-124	124	---	---	---	---	---	---	---	121.6	118.9
	ST 3-2-145	145	---	---	---	---	---	---	---	141.1	137.1

**EXAMPLE** What is the correct Cv rating for a (1") ST 1-2-54 valve when placed on a 1-1/2" pipe?  
First go to the 1-1/2" pipe column and follow this down until you reach the ST 1-2-54 row  
The value where they meet is the corrected Cv rating, which is 38.1.

### Equal Percentage Flow

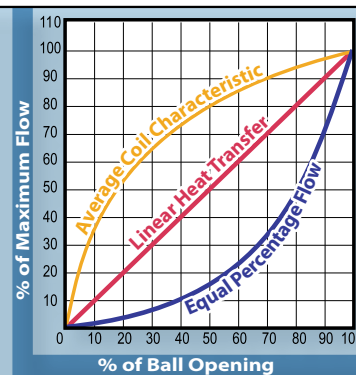


**Equal Percentage Flow Defined:**

The flow changes by the same percentage as the valve position at a constant pressure drop. Our valve mirrors the quick opening characteristic of the coil resulting in linear heat transfer.

**Bray's Parabolic Port:**

Bray's 2-Way SoftTouch valves feature a parabolic port which is a permanent part of the ball. The parabolic port provides a wide range of Cv choices while maintaining equal percentage flow characteristics.

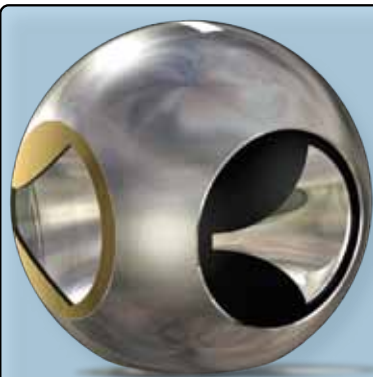


### 3-WAY - PIPING GEOMETRY CHART - Adjusted Cv

Valve Size	Valve Model Number	Nominal Cv	Pipe Size						
			3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
1/2"	ST 05-3-003	0.33	0.33	0.33	---	---	---	---	---
	ST 05-3-006	0.60	0.60	0.60	---	---	---	---	---
	ST 05-3-01	1.0	1.0	1.0	---	---	---	---	---
	ST 05-3-02	2.4	2.4	2.3	---	---	---	---	---
	ST 05-3-04	4.3	4.1	3.9	---	---	---	---	---
	ST 05-3-08	8	6.9	6.2	---	---	---	---	---
3/4"	ST 75-3-01	1.3	---	1.3	1.3	---	---	---	---
	ST 75-3-02	2.4	---	2.4	2.4	---	---	---	---
	ST 75-3-04	3.8	---	3.8	3.8	---	---	---	---
	ST 75-3-11	11	---	10.6	10.1	---	---	---	---
1"	ST 1-3-09	8.6	---	---	8.6	8.5	---	---	---
	ST 1-3-15	15	---	---	14.8	14.4	---	---	---
	ST 1-3-22	22	---	---	21.3	20.4	---	---	---
1-1/4"	ST 125-3-13	13	---	---	---	13.0	12.8	---	---
	ST 125-3-19	19	---	---	---	18.9	18.4	---	---
	ST 125-3-34	34	---	---	---	33.2	31.1	---	---
1-1/2"	ST 150-3-13	13	---	---	---	---	13.0	12.9	---
	ST 150-3-24	24	---	---	---	---	23.7	23.4	---
	ST 150-3-61	61	---	---	---	---	56.7	52.8	---
2"	ST 2-3-38	38	---	---	---	---	---	37.8	37.4
	ST 2-3-57	57	---	---	---	---	---	56.2	55.1
	ST 2-3-109	109	---	---	---	---	---	103.6	97.2

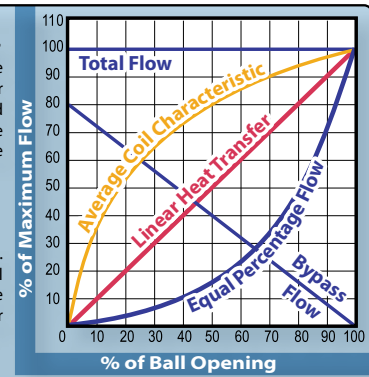
**EXAMPLE** What is the correct Cv rating for a (1-1/4") ST 125-3-34 valve when placed on a 2" pipe?  
First go to the 2" pipe column and follow this down until you reach the ST 125-3-34 row  
The value where they meet is the corrected Cv rating, which is 31.1.

#### Equal Percentage Flow



**True Equal Percentage Flow Gives You Linear Heat Transfer**  
Linear heat transfer means the relationship between the valve opening percentage and increase in heat transfer is linear. Your temperature is functioning efficiently because it is being controlled according to design. The linear heat transfer of our 3-Way valve means an end to fluctuating comfort conditions. Temperature adjusts smoothly to meet changing load conditions.

**Bypass Cv Designed Not to Exceed 80% of the Straight Through Cv. Keeps the System Running to Design**  
Systems are designed for specific pressure drop across the coil. When a 3-Way valve is in full bypass mode, the system loses this coil pressure drop. It is important to have a low bypass Cv to allow the bypass to compensate for the coil being bypassed with a higher pressure drop.



2-WAY On/Off & Tri-State			NON SPRING RETURN ACTUATORS					SPRING RETURN ACTUATORS		
			Tri-State 24VAC Terminal Strip	Tri-State 24VAC	On/Off Tri-State 24VAC* Terminal Strip	Tri-State 24VAC	On/Off Tri-State 24VAC/DC	On/Off 24VAC	On/Off 24VAC*	On/Off 24VAC/DC*
SIZE NPT	Cv	MODEL #	D24-35-T-TS	DC24-44-T	DC24-44-T-TS DCP24-45-T-TS	D24-53-T	D24-70	DCS24-20 DCS24-20-T	DS24-27 DS24-27-T	DCS24-62 DCS24-62-T
2-WAY Modulating			NON SPRING RETURN ACTUATORS					SPRING RETURN ACTUATORS		
			0-10VDC 0-20mA • 24VAC	0-10VDC 0-20mA • 24VAC	0-10VDC 0-20mA • 24VAC • Terminal Strip	0(2)-10VDC 0(4)-20mA 24VAC	0(2)-10VDC 0(4)-20mA 24VAC/DC	0(2)-10VDC 0(4)-20mA • 24VAC/DC	0(2)-10VDC 0(4)-20mA • 24VAC/DC	0-10VDC 0-20mA • 24VAC/DC
SIZE NPT	Cv	MODEL #	DM24-35	DCM24-44	DCM24-44-TS DCPM24-45-TS	DM24-53	DM24-70	DCMS24-20	DMS24-27	DCMS24-62
1/2"	0.38	ST 05-2-004	130	130	130	130	130	130	130	130
	0.68	ST 05-2-007	130	130	130	130	130	130	130	130
	1.3	ST 05-2-01	130	130	130	130	130	130	130	130
	2.6	ST 05-2-03	130	130	130	130	130	130	130	130
	4.7	ST 05-2-05	130	130	130	130	130	130	130	130
3/4"	11.7	ST 05-2-12	130	130	130	130	130	130	130	130
	3	ST 75-2-03	130	130	130	130	130	130	130	130
	4	ST 75-2-04	130	130	130	130	130	130	130	130
	10	ST 75-2-10	130	130	130	130	130	130	130	130
1"	15	ST 75-2-15	130	130	130	130	130	130	130	130
	29	ST 75-2-29	130	130	130	130	130	130	130	130
	9	ST 1-2-09	130	130	130	130	130			130
	15	ST 1-2-15	130	130	130	130	130			130
1-1/4"	28	ST 1-2-28	130	130	130	130	130			130
	54	ST 1-2-54	130	130	130	130	130			130
	15	ST 125-2-15	100	100	100	100	100			100
	37	ST 125-2-37	100	100	100	100	100			100
1-1/2"	41	ST 125-2-41	100	100	100	100	100			100
	102	ST 125-2-102	100	100	100	100	100			100
	23	ST 150-2-23		100	100	100	100			100
	41	ST 150-2-41		100	100	100	100			100
2"	74	ST 150-2-74		100	100	100	100			100
	171	ST 150-2-171		100	100	100	100			100
	42	ST 2-2-42				100	100			100
	71	ST 2-2-71				100	100			100
2-1/2"	108	ST 2-2-108				100	100			100
	266	ST 2-2-266				100	100			100
	55	ST 250-2-55				100	100			100
	72	ST 250-2-72				100	100			100
3"	100	ST 250-2-100				100	100			100
	202	ST 250-2-202				100	100			100
	63	ST 3-2-63				100	100			100
	82	ST 3-2-82				100	100			100
3"	124	ST 3-2-124				100	100			100
	145	ST 3-2-145				100	100			100

\* Available in 120VAC.  
 • Requires field furnished 500 Ohm resistor.  
 Refer to the Actuator Section for a list of actuators with additional options (i.e. auxiliary switches etc.)

**Key**  
**ST05-2-05** = **ST** SoftTouch Valve Series    **05** Size (in.)    **2** Configuration 2 = 2 Way    **05** Cv    **SSBS** Trim Type if special



SoftTouch Ball Valves



## 3-Way Standard & SSBS Close-Off Chart (PSI)

### 3-WAY - Close-Off Chart (PSI)

<b>3-WAY</b> <b>On/Off &amp; Tri-State</b>			<b>NON SPRING RETURN ACTUATORS</b>					<b>SPRING RETURN ACTUATORS</b>		
			Tri-State 24VAC Terminal Strip	Tri-State 24VAC	On/Off Tri-State 24VAC* Terminal Strip	Tri-State 24VAC	On/Off Tri-State 24VAC/DC	On/Off 24VAC	On/Off 24VAC*	On/Off 24VAC/DC*
SIZE NPT	Cv	MODEL #	D24-35-T-TS	DC24-44-T	DC24-44-T-TS DCP24-45-T-TS	D24-53-T	D24-70	DCS24-20 DCS24-20-T	DS24-27 DS24-27-T	DCS24-62 DCS24-62-T
<b>3-WAY</b> <b>Modulating</b>			<b>NON SPRING RETURN ACTUATORS</b>					<b>SPRING RETURN ACTUATORS</b>		
			0-10VDC 0-20mA • 24VAC	0-10VDC 0-20mA • 24VAC	0-10VDC 0-20mA • 24VAC Terminal Strip	0(2)-10VDC 0(4)-20mA 24VAC	0(2)-10VDC 0(4)-20mA 24VAC/DC	0(2)-10VDC 0(4)-20mA • 24VAC/DC	0(2)-10VDC 0(4)-20mA • 24VAC/DC	0-10VDC 0-20mA • 24VAC/DC
SIZE NPT	Cv	MODEL #	DCM24-35	DCM24-44	DCM24-44-TS DCPM24-45-TS	DM24-53	DM24-70	DCMS24-20	DMS24-27	DCMS24-62
1/2"	0.33	ST 05-3-003	50	50	50	50	50	50	50	50
	0.59	ST 05-3-006	50	50	50	50	50	50	50	50
	1.0	ST 05-3-01	50	50	50	50	50	50	50	50
	2.4	ST 05-3-02	50	50	50	50	50	50	50	50
	4.3	ST 05-3-04	50	50	50	50	50	50	50	50
3/4"	8.0	ST 05-3-08	50	50	50	50	50	50	50	50
	1	ST 75-3-01	50	50	50	50	50	50	50	50
	2	ST 75-3-02	50	50	50	50	50	50	50	50
	4	ST 75-3-04	50	50	50	50	50	50	50	50
1"	11	ST 75-3-11	50	50	50	50	50	50	50	50
	9	ST 1-3-09	50	50	50	50	50			50
	15	ST 1-3-15	50	50	50	50	50			50
1-1/4"	22	ST 1-3-22	50	50	50	50	50			50
	13	ST 125-3-13	40	40	40	40	40			40
	19	ST 125-3-19	40	40	40	40	40			40
1-1/2"	34	ST 125-3-34	40	40	40	40	40			40
	13	ST 150-3-13		40	40	40	40			40
	24	ST 150-3-24		40	40	40	40			40
2"	61	ST 150-3-61		40	40	40	40			40
	38	ST 2-3-38				40	40			40
	57	ST 2-3-57				40	40			40
2-1/2"	109	ST 2-3-109				40	40			40
	74	ST 250-3-74				40	40			40
	100	ST 250-3-100				40	40			40

\* Available in 120VAC.

• Requires field furnished 500 Ohm resistor.

Refer to the Actuator Section for a list of actuators with additional options (i.e. auxiliary switches etc.)

<b>Key</b> <b>ST1-3-22</b>	ST	1	3	22	SSBS
	= SoftTouch Valve Series	Size (in.)	Configuration 2 = 2 Way 3 = 3 Way	Cv	Trim Type if special

