Characterized Port Three Way Ball Valves
Technical Instructions

The Characterized Port (-CP) Series 3-way Ball Valves are coupled with our Type A actuators to provide three-way mixing or diverting flow control. The ball valves are 1/4-turn rotary control valves and are available in 1/2-inch to 2-inch line sizes.

Features:

- ANSI 250 valve body rating.
- 200 psi close-off with ANSI Class IV leakage for all line sizes and actuators.
- Available with chrome-plated brass ball and brass stem or stainless steel ball and stem.
- Can be used as either a mixing or a diverting valve.
- Blow-out proof stem withstands high pressure.
- Universal mounting plate.
- Actuator and plate can be rotated (90-degree increments).
- Standoffs provide a thermal barrier between the actuator and the mounting plate.

Warning/Caution Notations:

WARNING:	⚠	Personal injury/loss of life may occur if you do not perform a procedure as specified.
CAUTION:	⚠	Equipment damage may occur if you do not perform a procedure as specified.

Specifications:

Valve body rating	ANSI 250/600 WOG
Static pressure:	360 psi (2482 kpa)
Media temperature	
1/2" to 1-1/4":	35°F to 250°F (2°C to 121°C)
1-1/2" to 2":	35°F to 230°F (2°C to 110°C)
Controlled media	Water, water-glycol solutions to 50%
Body	Forged Brass: ASTM B283
Flow Optimizer	Glass-filled polymer
Ball	Chrome-plated brass or stainless steel
Ball seals	Reinforced PTFE seals with EPDM O-rings
Female end connections	Brass
Stem	Brass or stainless steel
Stem seals	EPDM O-rings
Angle of rotation	0° to 90°
Flow coefficients	See Table 2
Close-off ratings	See Table 2 Close-off ratings per ANSI/FCI 70-2: Class IV for A-AB, Class III for B-AB
Maximum operating differential pressure	60 psi (35 psi for 2" valves)
Dimensions and service envelope	See Figure 5 and Table 1

Application:

Ball valves can control hot or chilled water and up to 50% glycol solution in mixing applications for air handlers, convectors, fan coil units, unit conditioners, radiation, and reheat coils

Valve can also be used for Diverting applications. See Page 3

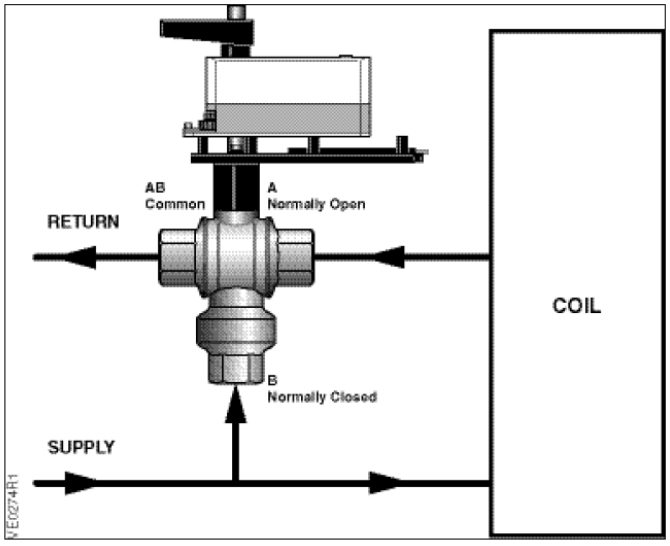


Figure 1. 3-Way Mixing Application

Operation:

The parabolic shape of the control port (A – AB) flow optimizer orifice (Figure 2) provides a slowly opening valve. Equal movements of the valve stem, at any point of the flow range, change the existing flow an equal percentage regardless of the existing flow. The ball valve equal percentage flow characteristic (Figure 3) mirrors the flow characteristic of a coil, resulting in linear heat transfer.

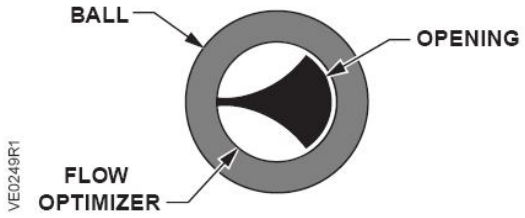


Figure 2. Ball Valve Flow Optimizer

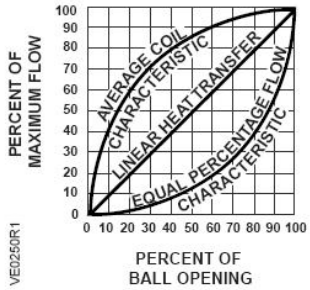


Figure 3. Ball Valve Equal Percentage Flow Control

Mounting and Installation:

- For added flexibility, the actuator mounting plate can be installed in any of the four (4) rotation angles relative to the valve body. See Figure 4.
- For best performance, install the valve assembly with the actuator above the valve body.
- The valve and actuator assembly can be installed in a horizontal pipe in any position between vertical and 90°. Do not install the valve assembly so that the actuator is below horizontal or upside-down.
- The ball valve also can be installed vertically.
- Allow sufficient space for servicing the valve and actuator. See Figure 5 for valve body dimensions and service envelope.

Mixing Applications:

- Install the valve so that the flow follows the direction of the arrow cast on the valve body. Flow is A to AB or B to AB. See Figure 1.

Diverting Applications:

- Install the valve so that the flow is opposite the direction of the arrow cast on the valve body. Flow is AB to A or AB to B.
  Note: Control Port is AB-A

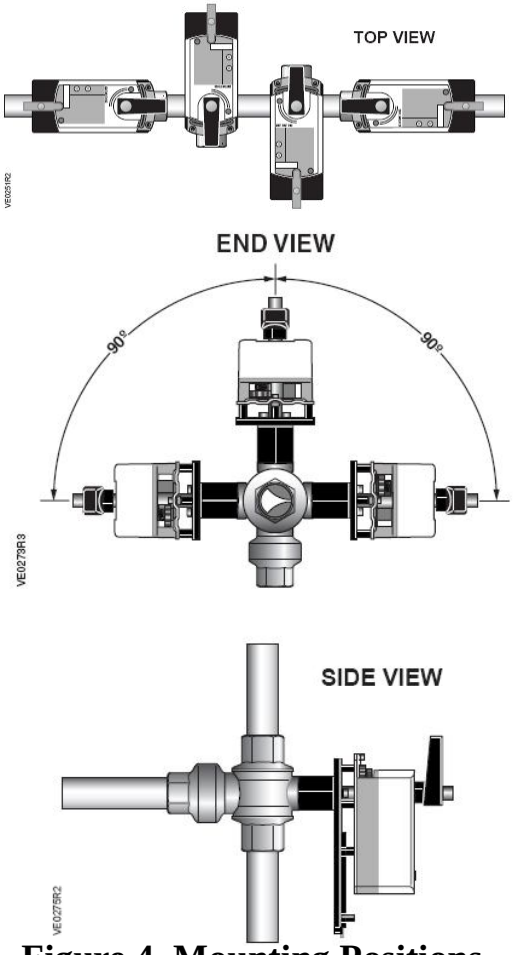
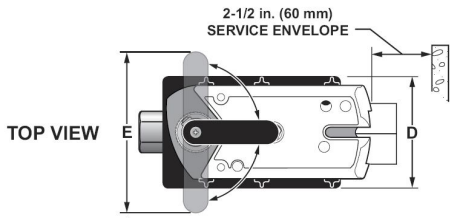
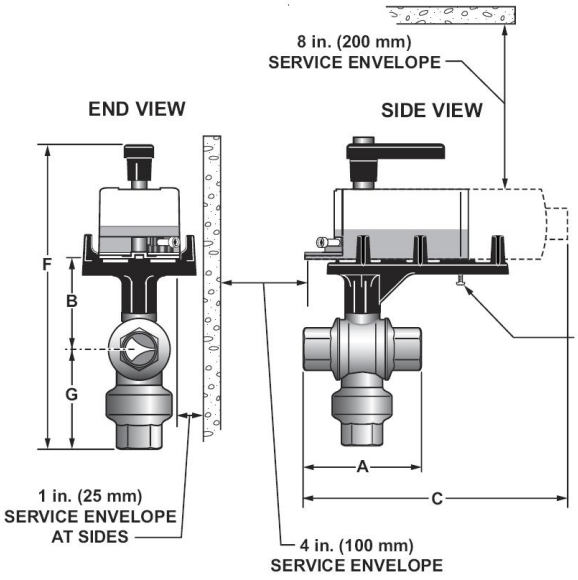


Figure 4. Mounting Positions

Figure 5. Dimensions—Three-Way Ball Valves and Actuator Dimensions





- **Dimension "D", Depth, is 3.7 inches(94.5 mm).**
- **Dimension "E", Handle/Indicator, is 5.3 inches (135.9 mm).**

Anti-Rotation Screw Must be Driven in Fully for EN44/EN88 Actuators <u>Only</u>

Table 1. Dimensions and Service Envelope.

Line Size Inches (mm)	Product Number	A Length	C Length * Actuators EN44 & EN88	C Length * Actuators ES62	B Height In. (mm)	G Height In. (mm)	F Height In. (mm)	Weight Lbs. (kg)
1/2 (15)	3-050-0.4-CP (-SBS) Through 3-050-10-CP (-SBS)	2-9/16 (65)	6-11/16 (170)	8-3/8 (213)	3-1/4 (83)	1-3/8 (35)	8-5/8 (219)	1.50 (0.68)
3/4 (20)	3-075-6.3-CP (-SBS)	2-3/4 (70)	6-11/16 (170)	8-3/8 (213)	3-1/4 (83)	1-3/8 (35)	8-5/8 (219)	1.60 (0.73)
	3-075-10-CP (-SBS) 3-075-16-CP (-SBS)	3-1/8 (79)				1-11/16 (43)		2.20 (1.00)
1 (25)	3-100-10-CP (-SBS)	3-1/4 (83)	6-11/16 (170)	8-3/8 (213)	3-3/4 (95)	1-11/16 (43)	9-1/8 (232)	2.37 (1.08)
	3-100-16-CP (-SBS) 3-100-25-CP (-SBS)	3-13/16 (77)	6-15/16 (176)	8-5/8 (219)	4 (102)	2 (51)	9-5/8 (244)	2.74 (1.24)
1-1/4 (32)	3-125-16-CP (-SBS) 3-125-25-CP (-SBS)	3-5/8 (92)	6-7/8 (174)	8-9/16 (217)	4 (102)	2-1/8 (54)	9-3/4 (248)	3.50 (1.59)
	3-125-40-CP (-SBS)	3-15/16 (100)	7 (178)	8-11/16 (221)	4 (102)	2-5/16 (59)	10-1/4 (260)	4.30 (1.95))
1-1/2 (40)	3-150-25-CP (-SBS) 3-150-40-CP (-SBS)	3-15/16 (100)	7 (178)	8-11/16 (221)	4 (102)	2-5/16 (59)	10-1/4 (260)	3.90 (1.76)
	3-150-63-CP (-SBS)	4-5/8 (117)	7-1/4 (184)	8-3/4 (222)	4-1/2 (114)	2-13/16 (71)	11 (279)	7.83 (17.16)
2 (50)	3-200-40-CP (-SBS)	4-5/8 (117)	7-1/4 (184)	8-3/4 (222)	4-1/2 (114)	2-7/8 (73)	10-3/8 (264)	6.70 (3.04)
	3-200-63-CP (-SBS) 3-200-100-CP (-SBS)			9-1/16 (230)	5-3/4 (146)		11-3/16 (284)	

- **Dimension C is maximum length, measured from the actuator, end fitting, or mounting plate, whichever extends the furthest.**
- **Fail safe three-way A-AB Open; B-AB Closed—Standard from the factory.**

Table 2. 3-Way Ball Valve Part Numbers, Close-off Ratings and CV's

Part Number	Valve Size (In)	Close-Off ΔP in psi	Cv
3-050-0.4-CP(-SBS)	1/2	200	0.40
3-050-0.63-CP(-SBS)			0.63
3-050-1.0-CP(-SBS)			1.0
3-050-1.6-CP(-SBS)			1.6
3-050-2.5-CP(-SBS)			2.5
3-050-4.0-CP(-SBS)			4.0
3-050-6.3-CP(-SBS)			6.3
3-050-10-CP(-SBS)*			10
3-075-6.3-CP(-SBS)	3/4	200	6.3
3-075-10-CP(-SBS)			10
3-075-16-CP(-SBS)*			16
3-100-10-CP(-SBS)	3/4	200	10
3-100-16-CP(-SBS)			16
3-100-25-CP(-SBS)*			25
3-125-16-CP(-SBS)	3/4	200	16
3-125-25-CP(-SBS)			25
3-125-40-CP(-SBS)*			40
3-150-25-CP(-SBS)	3/4	200	25
3-150-40-CP(-SBS)			40
3-150-63-CP(-SBS)*			63
3-200-40-CP(-SBS)	3/4	200	40
3-200-63-CP(-SBS)			63
3-200-100-CP(-SBS)*			100

* Denotes a full-port valve without flow optimizer insert.
NOTE: Maximum operating differential pressure = 60 psi for 1/2" to 1-1/2"; 35 psi for 2" valves.