

The logo for VSI (Vermont State Industries) is located in the bottom right corner. It consists of the letters "VSI" in a large, bold, green serif font with a white outline.

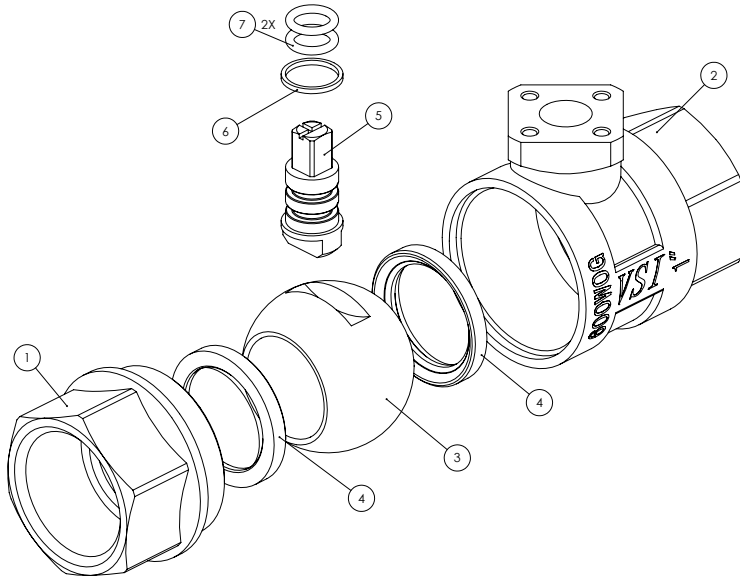
# SERIES E

## V-Port Control Ball Valve

## General Information

- Modified V-Port machined directly into the ball
- High Rangeability: 300:1 Turn down ratio
- Flow Characteristic: Modified Equal Percentage
- Low Torque - will accept most damper actuators
- Wide Cv range for various HVAC applications
- 200psi zero-leakage close off

**Body Material:** 2 Piece Forged Brass  
**End Connections:** Female NPT  
**Body Pressure Rating:** 600 WOG  
**Working Pressure:** 200psi Close Off  
**Max Diff. Control:** 50psi  
**Leakage:** ANSI/FCI 70-2 Class VI (Zero Leakage)



1	Body Section 1	Forged Brass CW617N
2	Body Section 2	Forged Brass CW617N
3	Ball	Hard Chrome Plated Brass
4	Seats	PTFE G500
5	Stem	Forged Brass CW617N
6	Stem Bushing	PTFE G500
7	Stem O-Ring	Viton 70

## Sample Specification

### 1. GENERAL

1.1. SCOPE. This section covers the furnishing of manually operated or remote actuated ball valves as specified herein.

1.2. IDENTIFICATION. All ball valves shall be provided with a permanent identification plate. The plate at a minimum should indicate the manufacturer, model number, serial number, major build material, and relevant ratings.

### 2. PRODUCTS

2.1. TYPE. Ball valves for control shall be the two-piece threaded connection type with a full port diameter or a characterized ball for flow control. Valve stem shall be blow-out proof, feature a PTFE bushing, and at minimum double o-ring sealing.

2.1.1. Characterization. Valves for flow control service shall be supplied with modified equal percentage flow characterization. Flow characterization shall be directly machined into the metallic ball. Plastic inserts retained by friction, adhesive, or clips are not acceptable.

2.1.2. Ratings. Ball valves shall have a 600 WOG body rating and be rated to 200 psi close off with zero-leakage to ANSI/FCI 70-2, Class VI. Valves that are not rated Class VI shall not be accepted. Valves shall be rated to minimum 250°F.

### 2.2. MATERIAL

2.2.1. Body. The valve body shall be made of accurately machined forged Brass.

2.2.2. Ball. The valve ball shall be made of hard chrome plated forged Brass.

2.2.3. Seat. Valves seats and stem bushing shall be virgin PTFE.

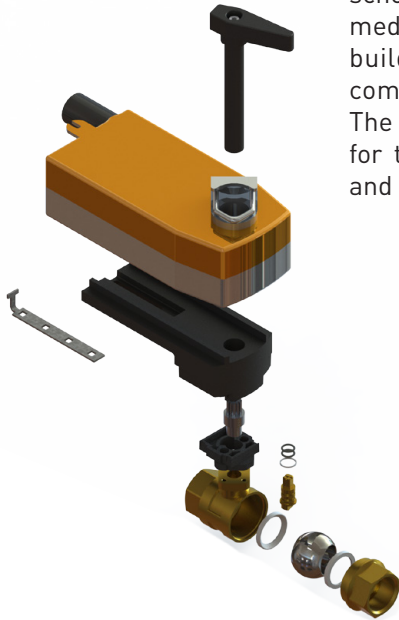
2.2.4. O-Rings. Stem o-rings shall be Viton.

2.3. ACTUATION. All ball valves shall feature universal mounting, allowing the use of any specified pneumatic or electric actuator.

3. SUPPLY. All ball valves shall be supplied by Valve Solutions, Inc (VSI) or equal. Valve and any linkage shall carry a full twelve month warranty.

## The HVAC Standard of Choice

Creating comfortable and efficient building environments begins with a consistent and controllable HVAC system. The 200psi close off of the VSI Series E ball valve gives them the ability to handle the toughest service in facilities such as schools and universities, medical facilities, office buildings, and other commercial properties. The Series E is suitable for the following service and more:



- Chilled Water
- Hot Water
- Up to 50% Glycol solution

## Designed to Last

The fully machined metal ball of the VSI Series E is simple but rugged and reliable. There are no plastic inserts to melt or loosen and no clips to induce flow disturbances and its resulting vibration and noise. Compare the VSI Series E to the competition and the robust differences are evident:



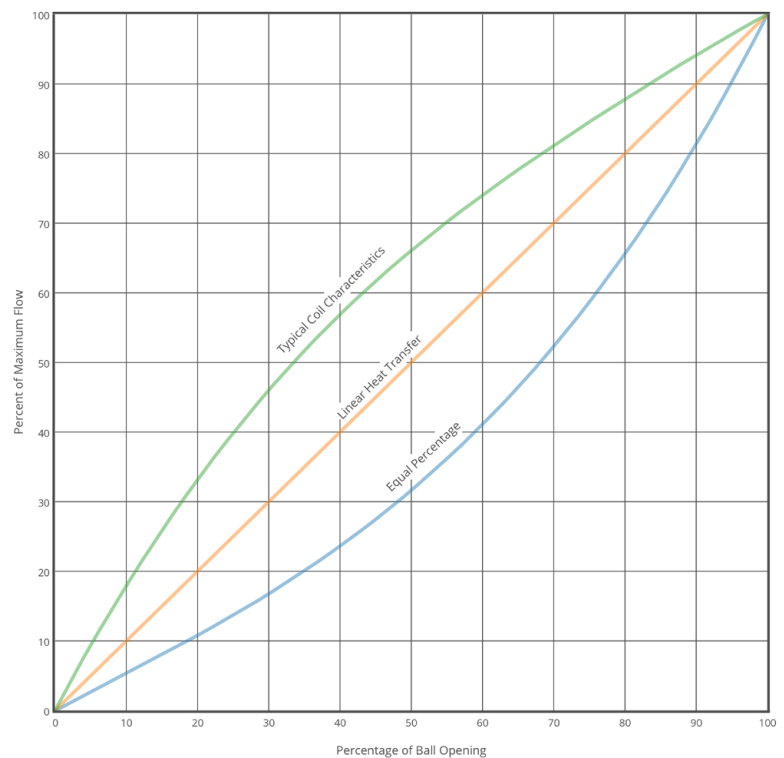
VSI Series E



Competitors

## Equal Percentage Flow

The equal percentage flow in the VSI Series E Ball valve is optimized to cover the vast majority of control systems in use today; opening the valve any certain percentage will cause the same percentage increase in flow no matter what the initial position. This equal percentage flow mirrors the typical quick opening characteristic of coils in heat transfer applications, resulting in a linear heat output to the valves shaft percentage



The "concave" nature of the valve characteristics counteracts the "convex" nature of the coil. The net result is that heat output becomes proportional to the stem position. This characteristic lends itself to straightforward implementation for modulating proportional control of heating and cooling coils and other coil based heat exchangers. This flow type is present on most globe control valves making the Series E a great upgrade and retro-fit solution for systems with aging globe control valves

## Flow and Torque Information

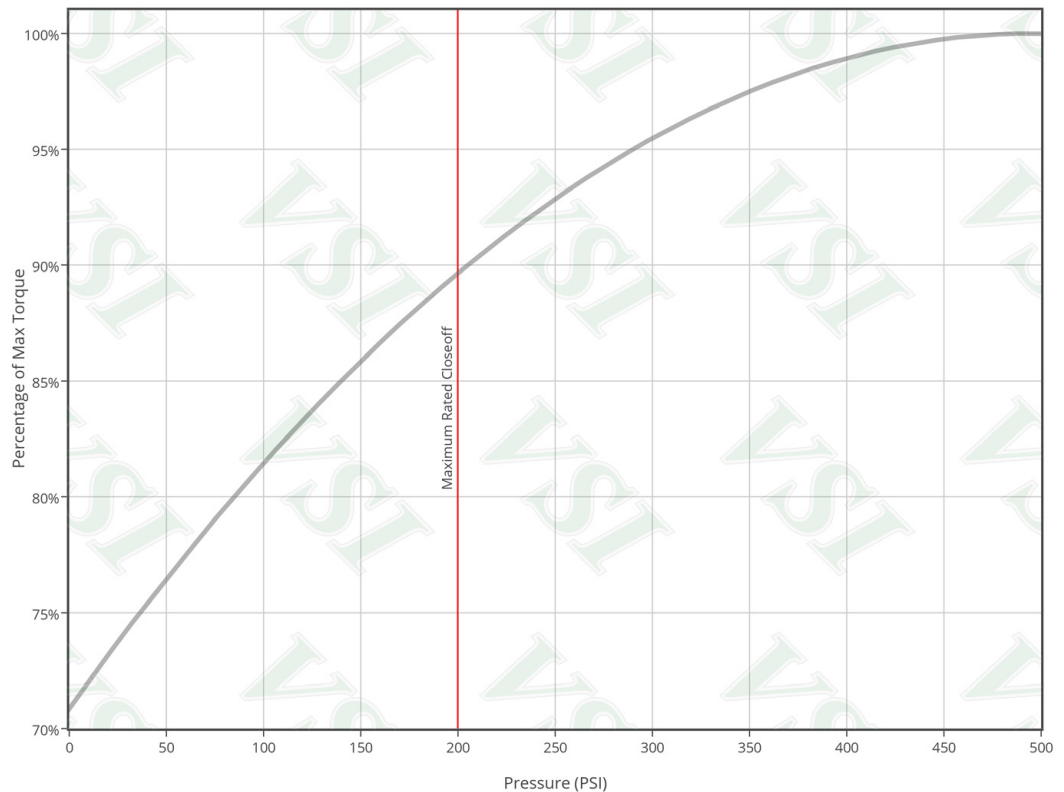
Flow Coefficients (Cv) for Series E Ball Valves - V Port													Torque at 200psi in/lb
Valve Size	Part Number	Valve Rotation in Percent										Weight Lbs	
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%		
1/2"	BV-050-001	N/A	N/A	0.01	0.07	0.25	0.46	0.70	0.96	1.29	1.67	.5	<10
	BV-050-002	N/A	N/A	0.03	0.19	0.37	0.59	0.88	1.29	1.88	2.33		
	BV-050-003	N/A	0.05	0.12	0.31	0.52	0.74	1.02	1.55	2.35	3.61		
	BV-050-100*												
3/4"	BV-075-001	0.02	0.08	0.16	0.44	0.73	1.12	1.79	2.90	4.52	6.63	.8	18
	BV-075-100*												
1"	BV-100-001	0.02	0.16	0.53	0.93	1.42	2.14	3.24	4.96	7.46	10.87	1.1	40
	BV-100-100*												
1 1/4"	BV-125-001	0.04	0.31	0.92	1.54	2.41	3.88	6.29	9.92	14.67	20.85	1.7	40
	BV-125-100*												
1 1/2"	BV-150-001	0.05	0.39	1.33	2.39	3.82	6.32	10.21	16.47	25.82	36.32	2.3	60
	BV-150-100*												
2"	BV-200-001	0.07	0.61	1.97	3.56	5.7	9.34	15.26	24.60	39.27	54.25	4.2	70
	BV-200-100*												

\*FULL PORT BALL

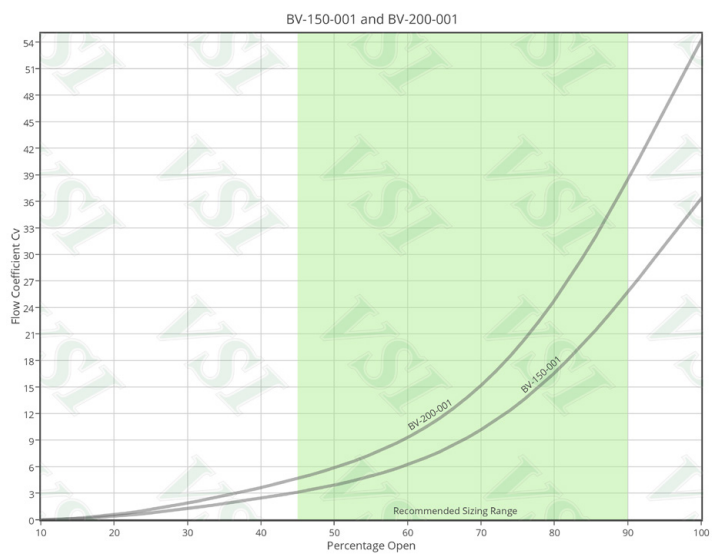
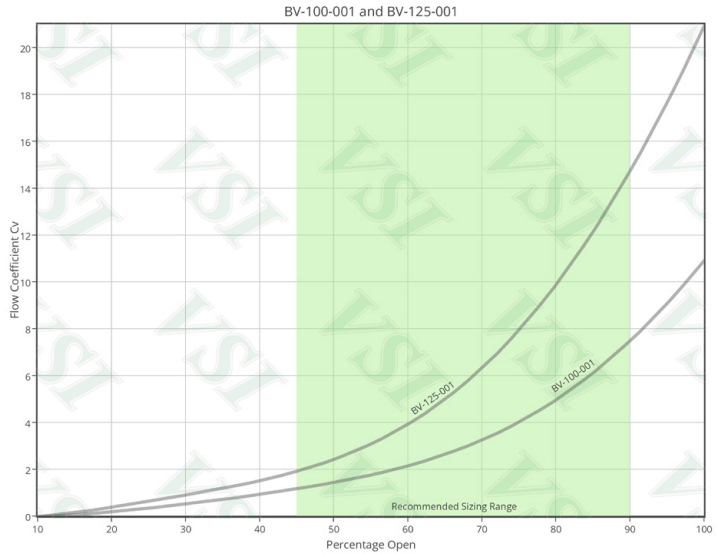
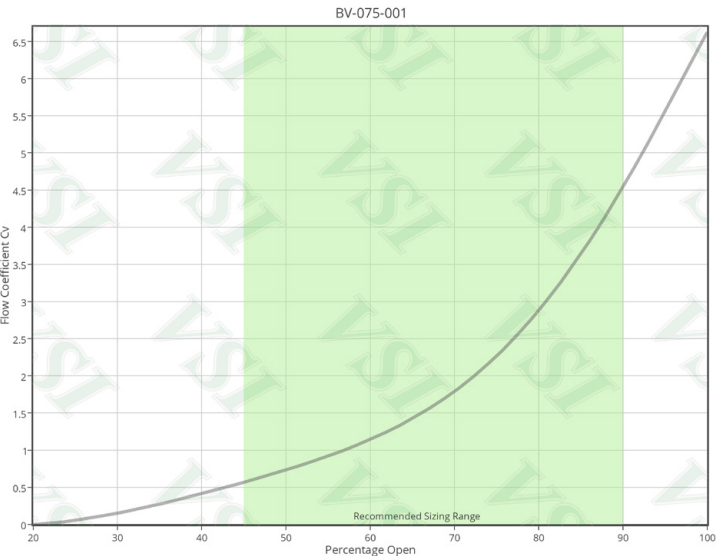
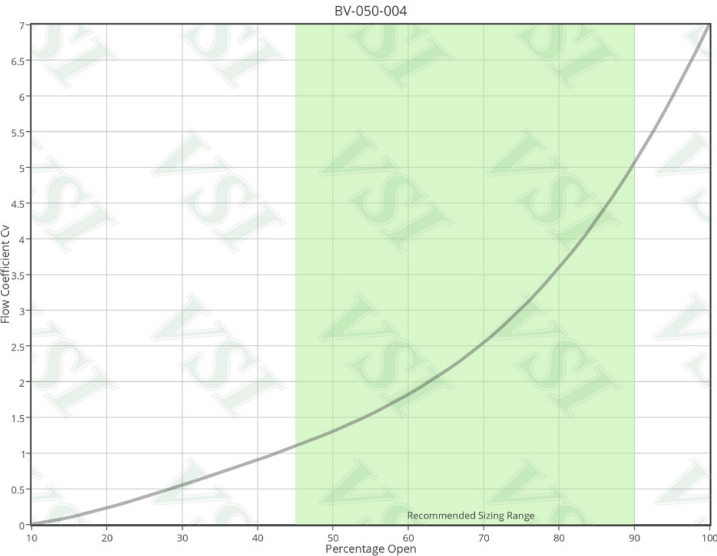
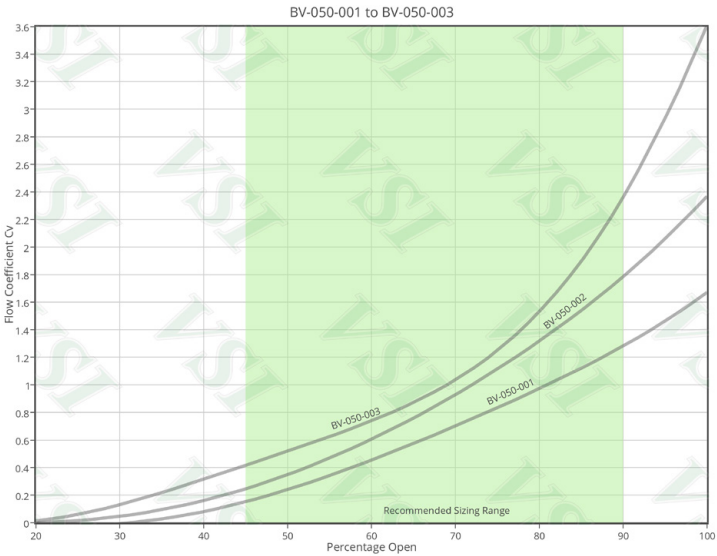
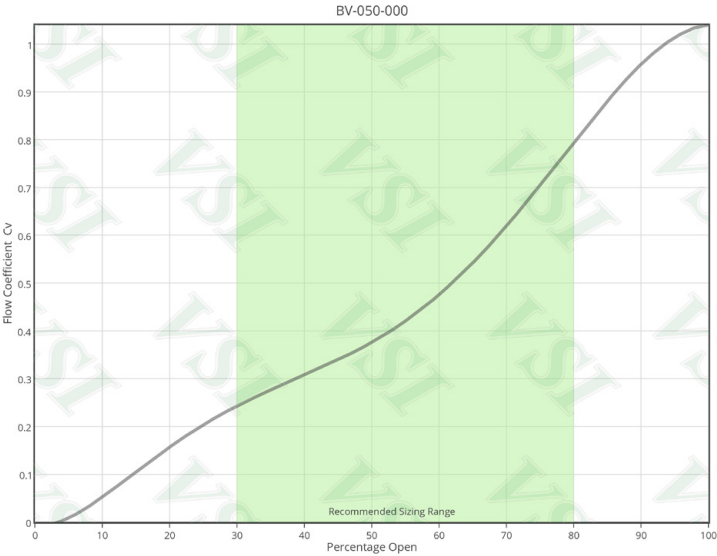
Listed torques are for liquid at 200psi. To determine torque at other pressures use the chart to the right, taking notice that 200psi is the maximum rated zero leakage closeoff pressure.

Ex: A 1" valve at 75psi will have 80% of full torque value. The 200psi torque is 89%, therefore:

$$t = (80\%/89\%) * 40\text{inlb} = \underline{36\text{inlb}}$$





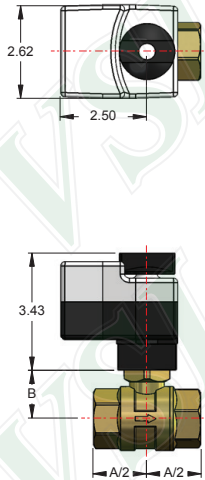


# Actuator Close-Off Sizing

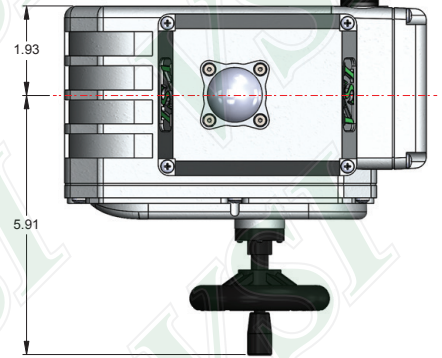
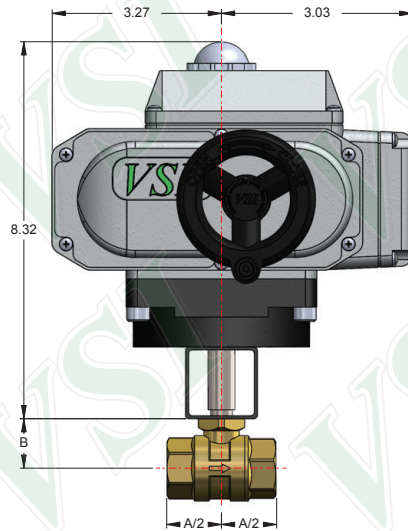
Valve Size		1/2"					3/4"					1"		1-1/4"		1-1/2"		2"			
Valve Part Number		BV-050-000	BV-050-001	BV-050-002	BV-050-003	BV-050-004	BV-050-100	BV-075-000	BV-075-001	BV-075-002	BV-075-003	BV-075-100	BV-100-001	BV-100-100	BV-125-001	BV-125-100	BV-150-001	BV-150-100	BV-200-001	BV-200-100	
Cv		1.04	1.67	2.33	3.61	7.12	10.6	4	6.63	11.66	19.69	24	10.87	44	20.85	94	36.32	128	54.25	185	
Actuator Model	Diagram Num.	Maximum Close-Off Pressure (PSI)																			
VSI Electric Acutators 24, 120, or 220 VAC																					
1005-X	3	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
1005S-X	3	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
VSI Double Acting Pneumatic																					
C-45DA	4	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
VSI Spring Return Pneumatic																					
C-63SR	4	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Belimo Floating/2 Position Non-Spring Return																					
TR24-3	1	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	-	-	-	-	
LMB24-3	2	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	
NMX24-3	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	200	200	200	200	
NMB24-3	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	200	200	200	200	
Belimo 2 Position Spring Return																					
TFB24	2	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	-	-	-	-	
LF24	2	200	200	200	200	200	200	200	200	200	200	200	75	75	75	75	-	-	-	-	
NFB24	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	200	200	200	200	
Belimo Modulating Non-Spring Return																					
TR24-SR	1	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	-	-	-	-	
LMB24-SR	2	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	
NMX24-SR	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	200	200	200	200	
NMB24-SR	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	200	200	200	200	
Belimo Modulating Spring Return																					
TFB24-SR	2	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	-	-	-	-	
LF24-SR	2	200	200	200	200	200	200	200	200	200	200	200	75	75	75	75	-	-	-	-	
NFB24-SR	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	200	200	200	200	
Siemens Floating or Modulating Non-Spring Return																					
GDE	2	200	200	200	20	200	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-
GLB	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	
Siemens 2 Position or Modulating Spring Return																					
GQD	2	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	-	-	-	-	
GMA	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	200	200	75	75	
GCA	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	
Johnson Controls Floating or Modulating Non-Spring Return																					
M9102	2	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	-	-	-	-	
M9104	2	200	200	200	200	200	200	200	200	200	200	200	75	75	75	75	-	-	-	-	
M9106	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	75	75	-	-	
M9108	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	
M9109	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	200	
Johnson Controls 2 Position or Modulating Spring Return																					
M9203	2	200	200	200	200	200	200	200	200	200	200	200	-	-	-	-	-	-	-	-	
M9208	2	-	-	-	-	-	-	-	-	-	-	-	200	200	200	200	200	200	200	200	

\*Actuator sizing is representative only, contact VSI for specialty applications

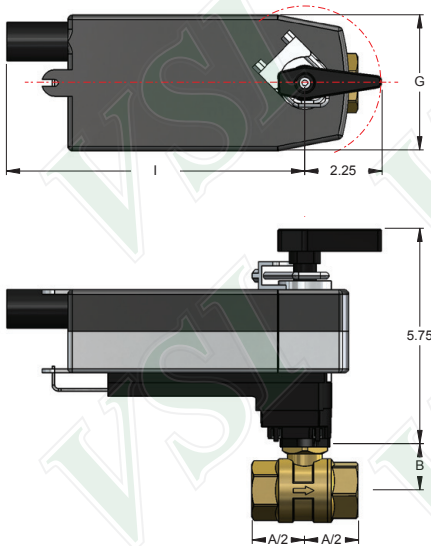
**DIAGRAM 1**



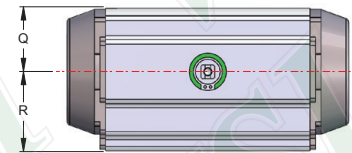
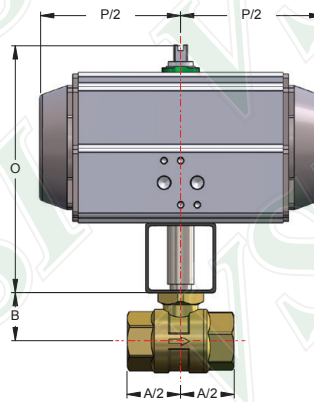
**DIAGRAM 3**



**DIAGRAM 2**



**DIAGRAM 4**



SIZE	A	B	G		I		O		P		Q		R	
			Min.	Max.*	Min.	Max.*	DA	SR	DA	SR	DA	SR	DA	SR
1/2"	2.20	1.06	2.70	3.94	5.60	7.38	5.15	6.23	2.40	3.31	1.22	1.42	1.44	1.85
3/4"	2.52	1.20												
1"	2.91	1.38												
1-1/4"	3.35	1.59												
1-1/2"	3.90	1.86				8.69								
2"	4.33	2.10												

\*Dimension varies based on actuator selection, see actuator data sheet for detailed dimensions



### **VSI Limited Product Warranty**

This limited warranty applies in the United States to products manufactured by VSI, LLC. VSI, LLC. warrants the product purchased from it or its authorized reseller to be free from defects in material and workmanship under normal use during the twelve month warranty period from the date of its purchase. Other products not manufactured by VSI, LLC. which are provided as part of an assembly may carry additional warranties from that manufacturer or supplier.

During the warranty period, VSI, LLC. will repair or replace defective parts of the product, or, at VSI, LLC. sole option, issue a credit for the original purchase price of the product. Repaired or replaced product will be warranted hereunder only for the remaining portion of the original warranty period. All exchanged products under this Limited Warranty will become the property of VSI, LLC. A proper Return Material Authorization (RMA) number will have to be obtained for all products to be returned under this Limited Warranty. Any claim under this Limited Warranty must include a description of the problem encountered and any relevant information that may assist VSI, LLC. in the replication or resolution of the problem.

This Limited Warranty is transferable during its term to the end user of the product. Any transfer shall not extend or alter the terms of this Limited Warranty.

This Limited Warranty extends only to products purchased from VSI, LLC. or its authorized reseller and does not extend to any product that has been damaged or rendered defective as a result of (a) modification, repair, alteration or improper installation by any person other than VSI, LLC. or its authorized representative; (b) unreasonable or improper use or storage, use beyond rated conditions, operation other than per VSI, LLC. or the manufacturer's instructions, or being otherwise subjected to improper maintenance, negligence or accident; or (c) any use of the product after purchaser has knowledge of any defect in the product.

**The warranties provided above are in lieu of and exclude all other warranties, statutory, express or implied, including without limitation any warranty or merchantability or fitness for a particular purpose. VSI, LLC. expressly disclaims all warranties not stated in this limited warranty. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty.**

VSI, LLC. warranty liability shall not exceed the original purchase price of the defective product. VSI, LLC. is not liable for any damages caused by the product or other products or the failure of the product or other products to perform, including any lost profits, lost savings, incidental or consequential damages. VSI, LLC. is not responsible for charges resulting from the removal and/or replacement of the product. VSI, LLC. is not liable for any claims made by third parties or by the purchaser for a third party. This limitation applies whether damages are sought, or a claim is made, under the Limited Warranty or as a tort claim, product liability claim, contract claim, or any other claim. This limitation cannot be waived by any person. This limitation of liability will be effective even if VSI, LLC. or its authorized representative has been advised by the purchaser of the possibility of such damages.

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A large, stylized 'VSI' logo in a green, outlined font, set against a green background with a repeating hexagonal pattern.

[www.valvesolutions.com](http://www.valvesolutions.com)

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