BV-3pc. All Stainless

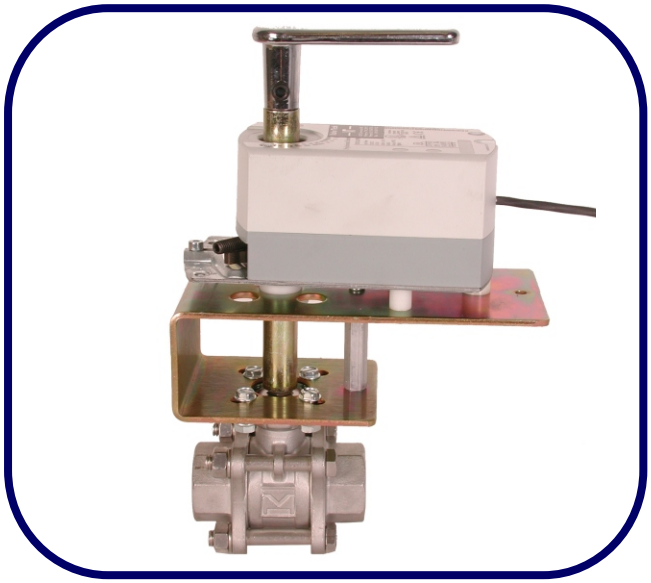
Series 23/24

Ball Valve, 3-Piece, NPT (60# Steam rating)

Electric 24 VAC - NEMA 2

Description

The BV Series NEMA 2 electronic assemblies are available in two-way configurations. Assemblies are complete with valve, zinc plated carbon steel mounting kit mounted with either a spring return or non-spring return actuator. All components are mounted, tested and calibrated before shipment. These two-way assemblies are for indoor applications.



Operation

Three-piece all stainless steel ball valves are powered with NEMA 2, 24 VAC electronic actuators and controlled by on/off, floating or modulating commands. On/Off actuators except a 24 VAC power supply that feeds the motor and drives the valve 90 degrees until the limit switch is tripped. The tripped switch shuts the motor down and the actuator holds the valves position until power is applied again. Floating is standard on the on/off actuators and allows use with three-wire output controllers. Modulating actuators function like on/off actuators except the actuator contains a servo card that responds to a 0-10 VDC signal. This input signal allows the actuator to accurately position the valve ball from full open to full close for maximum flow control.

Actuator Performance

- Housing protection NEMA 2 (indoor applications) Limited resistance to small amounts of falling dirt and water
- Agency approved listings C.S.A.,CE, UL and ISO 9001
- Power supply 24 VAC 50/60 Hz
- Controls available are on/off, floating, or modulating
- 0-10 VDC in and out standard on all modulating models
- Manual override capabilities standard on each actuator
- Visual position indicator that confirms valve travel
- Approximate running time 150 seconds for full 90° travel
- Operating temperature -25°F to +130°F
- Electrical connection 3 FT., 18 gauge appliance cable
- Patented self-centering jaws eliminates side loading
- Microprocessor protects against overload in stall conditions
- Non-Spring return Series 23, Spring return Series 24
- 2 year replacement warranty

Valve Performance

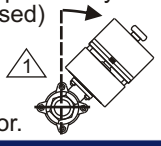
- Three-piece construction, investment cast 316 stainless steel
- ISO extended mounting platform for high cycle automation and added clearance for insulation
- Maintenance-free “live” loaded stem seal reduces stem leakage and automatically compensates for stem wear
- Secondary (back up) seal is provided by a Viton O-ring
- Blow-out proof stem prevents removal of stem when valve is in service
- RTFE seats and seals for maximum temperature of 420°F at 0 psi
- Valve body is full port rated 1000 WOG / 200 psi close off
- 1 year limited warranty

Two-way Default

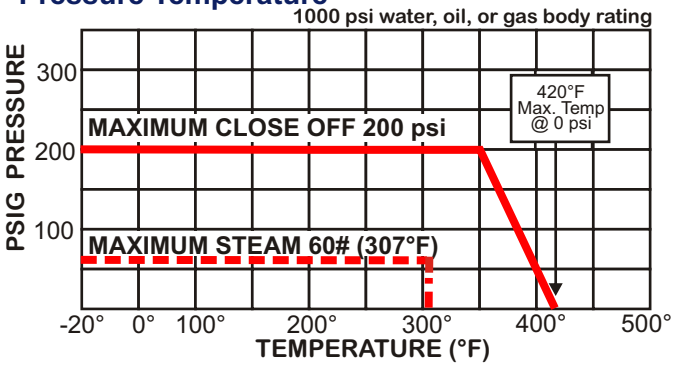
- 2-way non-spring return modulating assemblies will be set up closed at 0 VDC and fail in last position on loss of power
- 2-way spring return modulating assemblies will be set up normally open at 10 VDC and will fail open (Unless specified closed)

NOTE: Preferred Installation for Steam Service

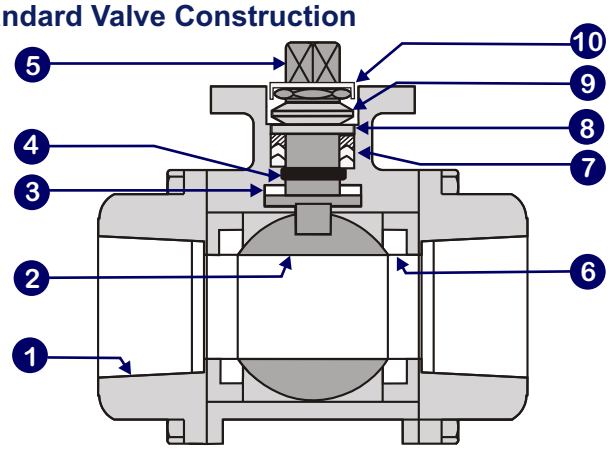
1 For steam applications the valve assembly must be mounted in piping at 45° angle. Do not allow radiant heat from boiler to reach the actuator.



Pressure Temperature



Standard Valve Construction



Item	Description	Materials	Item	Description	Materials
1	Body	Stainless	6	Ball Seat	RTFE
2	Ball	Stainless	7	Bushing & Packing	PTFE
3	Stem Seal	PTFE	8	Gland	Stainless
4	O-Ring	Viton	9	Belleville Washer	Stainless
5	Stem	Stainless	10	Adjusting Nut & Locking Saddle	Stainless

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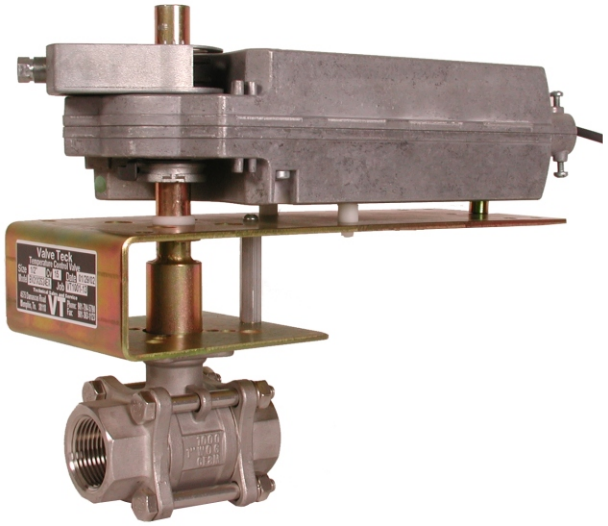
Valve Teck

Full Port

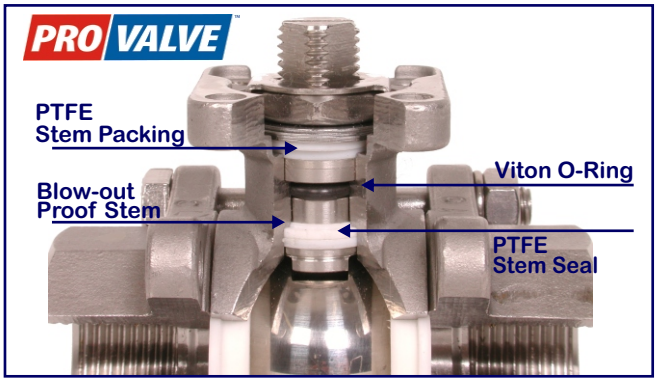
The BV Series all stainless three-piece ball valve incorporates several design features for improved performance in HVAC applications. The valves body is investment cast stainless steel which improves dimensional control and reduced porosity. All three piece stainless valves meet shell and seat tests ANSI/ASME B16.34 and API 598. Female NPT connections, FNPT meet the intent of ANSI B1.20.1. The large diameter ball has an increased bore opening for maximum flow capacity. The reinforced PTFE seats are filled with 15% glass fiber fill and are held in place by grooves cast in the valve body that fully encapsulate the seats to eliminate cold flowing under adverse temperatures and pressures. The PTFE body seal ensures sealing integrity between the three piece body components.

The control advantages when using the three-piece all stainless steel ball valve in HVAC applications are the inherent equal percentage flow characteristics, low pressure loss, and bubble tight close off capabilities. These features, along with the saturated steam rating of 60#, provide an ideal valve for temperature control in building automation systems.



Swing Out Body Design

The three-piece all stainless valve is especially suited for use in piping systems where line breaks are required and where total entry into the line is necessary. The center section can swing out and the seats and seals can be replaced quickly and easily without disturbing the pipe alignment. Acting as both a valve and a union the three-piece valve eliminates the need for a separate union.



Live Loaded High Performance Stem Seal

PTFE stem seal prevents debris from entering the stem area and acts as a lower bearing to maintain minimal run torques. A Viton O-ring eliminates stem leakage and ensures a long maintenance-free service life. Belleville washers make up the secondary seal and automatically compensate for stem wear during the life of the valve. Belleville washers or disc springs, exert a continuous load on the soft packing through the follower. When the valve is used in systems with frequent thermal cycling, the belleville washers accommodate dimensional shifts to maintain a tight seal.

Operating Conditions

- Temperature Range: -20°F to 420°F (@ 0 psi)
- Maximum Close Off: 2OO PSI
- 1000 psi WOG Rating: Water, Oil or Gas
- Saturated Steam Rating: 60 psi Maximum
- Chilled or Hot Water, Glycol up to 50%
- Bi-directional Close Off - ANSI Class 6

Equal Percentage Flow Characteristics

A round hole seat cooperating with a round hole bore in a valve ball typically achieves a equal percent flow characteristic. The like movements of the stem at any point of the flow range will change the existing flow in equal increments.

Quality Control

Series 23 non-spring return and Series 24 spring return actuators are low-profile, compact, durable and lightweight in design. Three basic standardized foot prints accommodate the entire range of actuators. Simplified wiring configurations allow for faster installations. All actuators contain brushless DC synchronous motors that are monitored by a microprocessor for current limiting protection.

Additional features include:

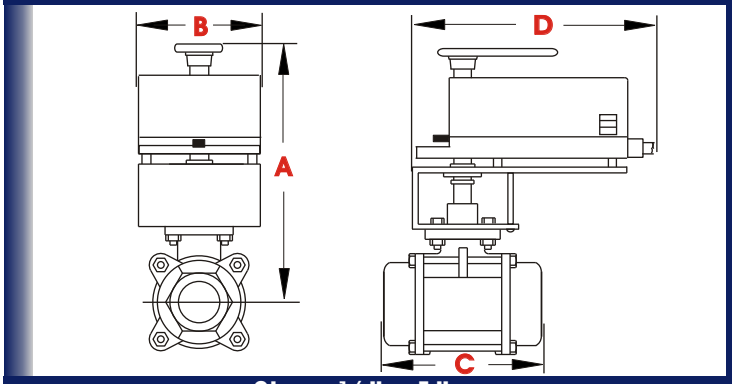
- Patented self-centering shaft coupling minimizes installation and extends the life of the actuator
- Modulating actuators equipped with 0-10 VDC feedback
- Actuators contain manual override that permits unpowered positioning to simplify installation
- Highly visible position indicator shows degree of rotation
- Optional built-in auxiliary switches, start span adjustable
- Designed for over 50,000 full strokes and 5,000,000 repositions at rated torque

Non-Spring	Non-Spring	Non-Spring
GDE 44 lb-in	GEB 132 lb-in	GBB 177 lb-in
GLB 88 lb-in	—	GIB 310 lb-in
Spring	**Spring**	**Spring**
—	GMA 62 lb-in	GCA 142 lb-in

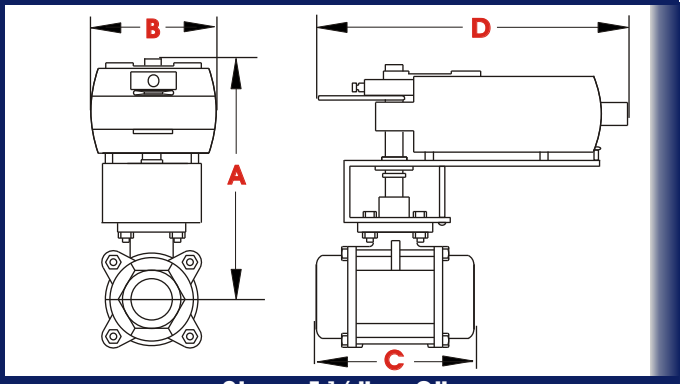
Dimensional Data

VALVE TECK

BV Series 23 Non-Spring Return



Sizes ½" - 1"

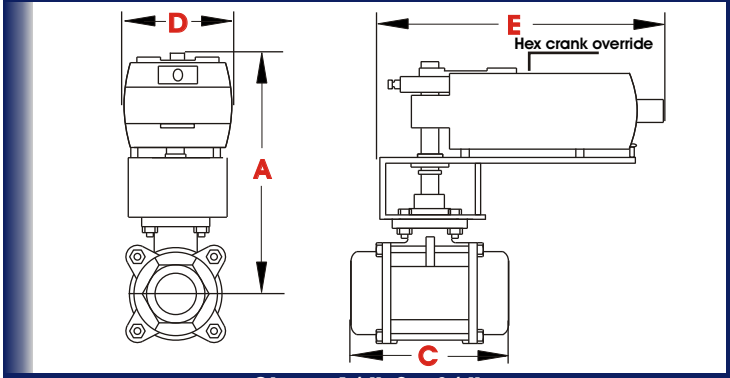


Sizes 1¼" - 2"

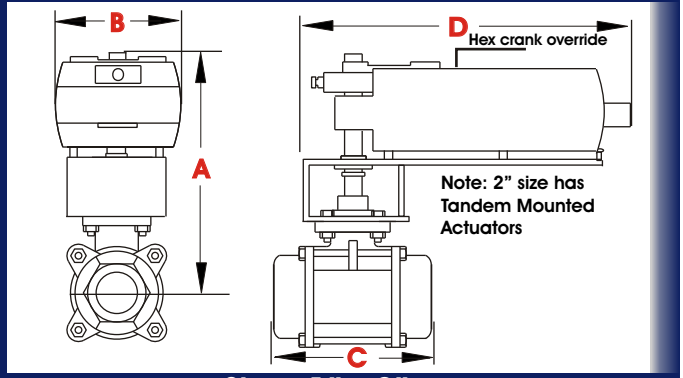
Standard Assembly, All Stainless 3-piece Valve, On/Off - Floating, 24 VAC, NEMA 2, Non-Spring
Modulating Service Change Last O to E in Model #, Accessories See Page 4

Assembly Specification					Wt.	VA Rating		Speed 90°	23 Series operator		Assembly Dimensions inch (For mm multiply: inch X 25.4=(mm))			
C_v	Size In	Size DN	Close off psi	Model Number	lb	On/Off	Mod.	On/Off Mod. (sec.)	On/off	Mod.	A	B	C	D
17	1/2"	15	200	BV21X3A23O	4	2.3	3.3	90	GDE131	GDE161	7¼"	3"	3"	6⅜"
34	3/4"	20	200	BV22X3A23O	5	2.3	3.3	90	GDE131	GDE161	7⅜"	3"	3⅛"	6⅜"
55	1"	25	200	BV23X3A23O	6	2.3	3.3	125	GLB131	GLB161	7¾"	3"	3½"	6⅜"
80	1¼"	32	200	BV24X3A23O	9	3	5	125	GLB131	GLB161	8"	3 3/16"	4⅜"	8¼"
143	1½"	38	200	BV25X3A23O	13	6	6	125	GBB131	GBB161	8½"	4"	4¾"	12½"
245	2"	50	200	BV26X3A23O	20	5.5	4.4	150	GBB131	GBB161	8⅞"	4"	5½"	12½"

BV Series 24 Spring Return



Sizes ½" & ¾"



Sizes 1" - 2"

Standard Assembly, All Stainless 3-piece Valve, On/Off, 24 VAC, NEMA 2, Spring Return
Modulating Service Change Last O to E in Model #, For Floating Assemblies and Accessories See Page 4

Assembly Specification					Wt.	VA Rating		Speed 90° (sec.)	24 Series operator		Assembly Dimensions inch (For mm multiply: inch X 25.4=(mm))			
C_v	Size In	Size DN	Close off psi	Model Number	lb	On/Off	Mod.	Run/Spring	On/off	Mod.	A	B	C	D
17	1/2"	15	200	BV21X3A24O	7	5	6	90/15	GMA121	GMA161	7¼"	3 3/16"	3"	8¼"
34	3/4"	20	200	BV22X3A24O	8	5	6	90/15	GMA121	GMA161	7⅜"	3 3/16"	3⅛"	8¼"
55	1"	25	200	BV23X3A24O	11	8	9	90/15	GCA121	GCA161	7¾"	4"	3½"	12½"
80	1¼"	32	200	BV24X3A24O	13	8	9	90/15	GCA121	GCA161	8"	4"	4⅜"	12½"
143	1½"	38	200	BV25X3A24O	22	8	9	90/15	(2)GCA121	(2)GCA151	11⅜"	4"	4¾"	12½"
245	2"	50	200	BV26X3A24O	30	16	18	90/15	(2)GCA121	(2)GCA151	11⅜"	4"	5½"	14½"

NOTE: Wiring Diagrams Under "Electrical Section" Series 23, 24 Tagged With Operator Model Number

Water Capacity Sizing Table in Gallons Per Minute, GPM

C_v	Size		Pressure Drop Across Valve									
	In	DN	1 psi	2 psi	3 psi	4 psi	5 psi	6 psi	7 psi	8 psi	9 psi	10 psi
17	1/2"	15	17	24	29	34	38	42	45	48	51	54
34	3/4"	20	34	48	59	68	76	83	90	96	102	108
55	1"	25	55	78	95	110	123	135	146	156	165	174
80	1-1/4"	32	80	113	139	160	179	196	212	226	240	253
143	1-1/2"	38	143	202	248	286	320	350	378	404	429	452
245	2"	50	245	346	424	490	548	600	648	693	735	775

If valve is equal to line size GPM=C_v x $\sqrt{\Delta p}$ which is expressed in the above table, if valve is smaller than line size, GPM= $C_v c$ x $\sqrt{\Delta p}$

Saturated Steam Capacity Sizing Table in Pounds Per Hour

Inlet pressure	6#		12#		18#		24#		30#		36#		42#		48#		54#		60#	
	On/Off	Mod.	On/Off	Mod.	On/Off	Mod.	On/Off	Mod.	On/Off	Mod.	On/Off	Mod.	On/Off	Mod.	On/Off	Mod.	On/Off	Mod.	On/Off	Mod.
C_v	10% of P1 ΔP=0.6	80% of P1 ΔP=4.8	10% of P1 ΔP=1.2	80% of P1 ΔP=10	10% of P1 ΔP=1.8	42% of P1 ΔP=14	10% of P1 ΔP=2.4	42% of P1 ΔP=19	10% of P1 ΔP=3.0	42% of P1 ΔP=19	10% of P1 ΔP=3.6	42% of P1 ΔP=21	10% of P1 ΔP=4.2	42% of P1 ΔP=24	10% of P1 ΔP=4.8	42% of P1 ΔP=26	10% of P1 ΔP=5.4	42% of P1 ΔP=29	10% of P1 ΔP=6.0	42% of P1 ΔP=31
17	177	446	282	653	380	828	476	987	570	1125	664	1276	757	1427	850	1578	943	1729	1035	1880
34	354	891	564	1307	761	1656	952	1974	1141	2250	1328	2552	1515	2854	1700	3157	1886	3459	2071	3761
55	573	1441	913	2114	1231	2678	1540	3193	1845	3640	2149	4129	2450	4617	2751	5106	3051	5595	3350	6083
80	833	2097	1328	3075	1790	3896	2240	4644	2684	5295	3125	6006	3564	6716	4001	7427	4437	8138	4873	8849
143	1490	3748	2373	5497	3199	6964	4004	8301	4798	9465	5586	10735	6370	12005	7152	13276	7932	14546	8710	15817
245	2552	6421	4066	9417	5482	11931	6860	14222	8221	16216	9571	18392	10914	20569	12253	22745	13589	24922	14922	27099

When sizing steam valves, different pressure drops are used depending on if the control valve is on/off or modulating. All inlet pressure columns have two sub columns. The left sub column is for on/off control and the right sub column is for modulating control. For on/off control, always use a minimum of 10% of inlet pressure (psig). The modulating control pressure drop takes into account the compressability of high or low pressure steam for precision control. For modulating with less then 15 psig steam, it is best to use 80% of gauge inlet pressure. For higher pressure steam greater then 15 psig, it is best to use 42% of the absolute inlet pressure. To size the steam valve, determine the inlet steam pressure. If it falls between two numbers select the larger of the two. Follow either the on/off or modulating sub columns down until you see the closest number to the required #/hr of steam. Again, if it falls between two numbers pick the larger of the two. Follow the row to the far left to obtain the C_v of the valve that will pass the desired #/hr of steam.

Adjusted C_v for Piping Geometry

Size		C_v	Line Size							
In	DN		1/2"	3/4"	1"	11/4"	11/2"	2"	21/2"	3"
1/2"	15	17	17	9.21	7.33	6.67	—	—	—	—
3/4"	20	34	—	34	23.0	18.1	16.1	—	—	—
1"	25	55	—	—	55	42.7	34.3	28.0	—	—
1-1/4"	32	80	—	—	—	80	67	49.2	42.9	—
1-1/2"	38	143	—	—	—	—	143	94	73	65
2"	50	245	—	—	—	—	—	245	182	143

Corrected $C_v c$ = C_v x Fp factor

Assembly Number

Standard Construction

BV	2	1X	3	A	23	E
1&2	3	4&5	6	7	8&9	10

Accessories

11	12

Ball Valve Assembly, 2-Way, ½" Full Port , NPT Ends 3-piece design, All Stainless Body and Ball, 24 VAC, NEMA 2 Actuator, Non-Spring Return, Modulating 0-10 VDC input

#	ITEM	CODE	DESCRIPTION
1 & 2	Series	BV	Ball Valve
3	Assembly	2	2-Way Configuration
4 & 5	Size	1X 2X 3X | 4X 5X 6X	½"=1X, ¾"=2X, 1"=3X | 1¼"=4X, 1½"=5X, 2"=6X
6	Valve Type	3	NPT 3 piece Full Port

#	ITEM	CODE	DESCRIPTION
7	Construction	A	All Stainless
8 & 9	Actuator	23 24	Non-Spring 24 VAC Spring Return 24 VAC
10	Controls	O E	On/Off / Floating Modulating 0-10 VDC input
11 & 12	Accessories	A V F 6	Auxiliary Switch 2-SPDT 120 VAC power Floating (Spring Return) 6 -Foot Cable (STD. is 3-ft)