

Series 41

Ball Valve, 2-Piece, NPT (15# Steam rating)

Electric 120 VAC - NEMA 4

Description

The BV bronze body Series 41 NEMA 4 electric assemblies are available in two-way and three-way, mixing or diverting configurations. Assemblies are complete with a full port bronze ball valve that is direct mounted with a non-spring return actuator. All components are mounted, tested and calibrated before shipment. These two-way and three-way assemblies are rated for outdoor applications.

Operation

Two-piece bronze body ball valves are powered with NEMA 4, 120 VAC electric actuators and controlled by on/off or modulating commands. On/Off actuators accept a 120 VAC power supply that feeds the motor and drives the valve 90° until the limit switch is tripped. The tripped switch shuts the motor down and the actuator holds the valve position until power is applied again. Modulating actuators function like on/off actuators except the actuator is controlled by a servo card that responds to a 0-10 VDC or 4-20 MA signal. These input signals allow the actuator to accurately position the ball valve from full open to full close for maximum flow control.



Actuator Performance

- Housing protection NEMA 4 (outdoor applications) This rating is designated for weatherproof enclosures
- Power supply 120 VAC 50/60 Hz
- Controls available are on/off or modulating (0-10 VDC/ 4-20 MA)
- Single phase capacitor run motor with thermal overload protection
- Manual override capabilities standard on all actuators
- Precision machined hardened alloy gearing is permanently lubricated for high efficiency and smooth energy transfer
- Adjustable single pole double throw auxiliary switches standard
- Heater installed in all actuators to guard against condensation
- Operating temperatures -40°F to +140°F
- Visual position indicator confirms valve travel
- Compact design provides maximum torque output relative to small actuator enclosure
- Self locking gears are permanently lubricated and will not back drive
- 2 year limited warranty

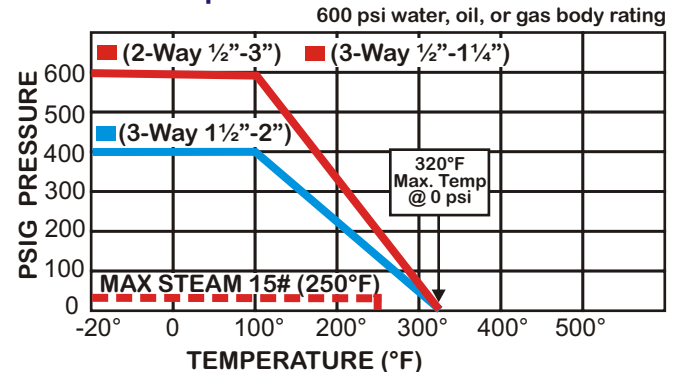
Valve Performance

- ISO extended mounting platform for high cycle automation and added clearance for insulation
- Double O-ring stem seal gives long maintenance-free service life and eliminates stem leakage
- PTFE seats and seals for maximum temperature of 320°F @ 0 psi
- Blow-out proof stem prevents removal of stem when valve is in service.
- Adjustable packing gland rides on PTFE packing and acts as a third stem seal that can be adjusted without removing actuator.
- Body rating: 2-way 600 psi, 3-way 1/2"-1 1/4" 600 psi, 1 1/2"-2" 400 psi
- Life cycle tested over 250,000 cycles
- 2 year limited warranty

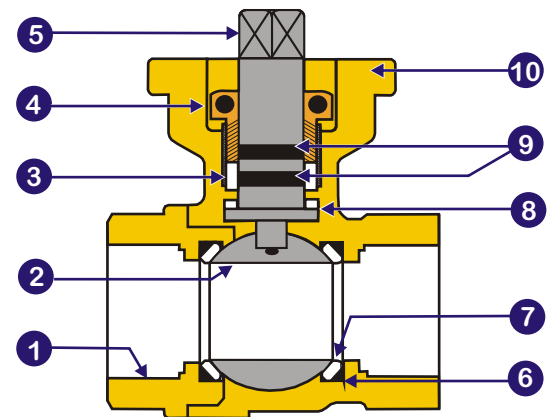
Two-way Default

- 2-way non-spring return modulating assemblies will be set up closed at 0 VDC and fail in last position on loss of power

Pressure Temperature



Standard Valve Construction



Item	Description	Materials	Item	Description	Materials
1	Body	Bronze	6	Seat Backing	EPDM
2	Ball	Brass/Chrome	7	Ball Seat	PTFE
3	Packing	PTFE	8	Stem Seal	PTFE
4	Gland	Brass	9	O-Ring	BUNA
5	Stem	Brass	10	Namur Mount	Bronze

Full Port

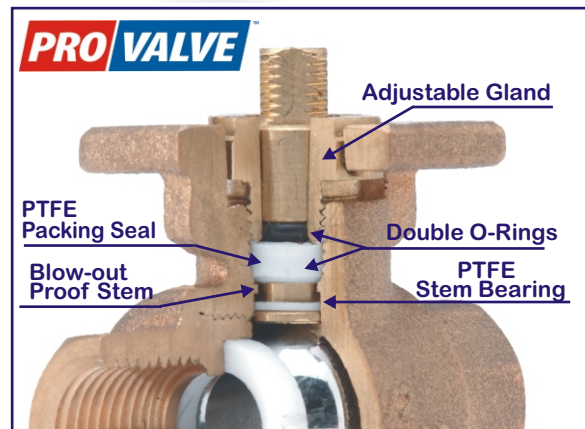
The BV bronze Series 41 assembly incorporates several design features for improved performance in HVAC / industrial applications. Valve assemblies are available in two-way and three-way configurations to fit most piping applications. The body is investment cast bronze which improves dimensional control and reduced porosity. The ball and stem are brass with the ball chrome plated to resist corroding. The PTFE seats are backed with EPDM to energize the Teflon and maintain a bubble tight close off over an extended period. The two-way valves are full port for maximum flow capacity while the three-way valves are full port 1/2"-1 1/2". Both two-way and three-way valves have female NPT connections, FNPT meet the intent of ANSI B1.20.1.

The control advantages when using the two-piece all bronze ball valve in HVAC / industrial 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 15#, provide an ideal valve for building automation systems or industrial applications.



High Performance Double O-Ring Stem Design

Bottom entry stem is blow-out proof and will not allow removal of the stem while the valve is under pressure. A PTFE stem seal prevents debris from entering the stem area and acts as a lower bearing to maintain low run torques. The double EPDM O-rings eliminate stem leakage and ensures a long maintenance-free service life. The O-ring design self compensates with wear. The stem seal also contains an adjustable packing gland that rides on a PTFE packing seal. The patented packing gland acts as a back up seal and can be tightened without taking the actuator off the valve body.



Direct Coupled Actuation

The large ISO mount pad provides an excellent base for stable low profile actuator mounting. The mounting holes in the valve are the same pattern as the mounting holes in the actuator so there is no mount kit needed. The valves shaft acts as the drive that fits directly into the actuator. The extended neck of the valve also allows for insulation clearance. Actuators are equipped with an assembly identification label that allows for full traceability as well as field identification of Cv, part number and size.

Equal Percentage Flow Characteristics

A round hole seat cooperating with a round hole bore in a valve ball typically achieves an 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.

Operating Conditions

- Temp Range: (see pressure/temp chart front page)
- Close Off: (same as body rating below)
- Body Rating: 2-Way 600 psi WOG
3-Way 600 psi WOG 1/2" - 1 1/4"
3-Way 400 psi WOG 1 1/2" - 2"
- Saturated Steam Rating: 15 psi Maximum
- Chilled or Hot Water, Glycol up to 50%
- Bi-directional Close Off - ANSI Class 6

Full Port Flow Data (US-GPM @ 1 psi)

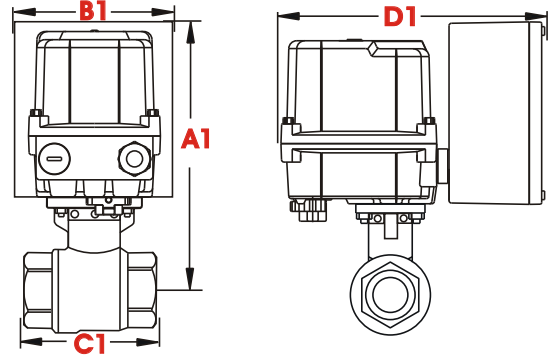
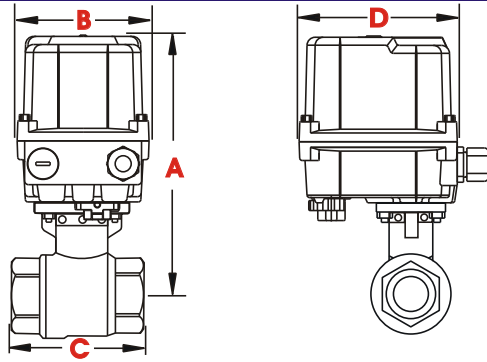
Table 1

Size	C _v	Range ability	Percent of Ball Opening (Degrees of Rotation)										Approx. Flow Char.
			10% (9)	20% (18)	30% (27)	40% (36)	50% (45)	60% (54)	70% (63)	80% (72)	90% (81)	100% (90)	
1/2"	13	186:1	0	0.05	0.19	0.51	0.96	1.69	2.99	6.11	9.55	13	EP
3/4"	24	270:1	0	0.15	0.54	1.23	2.31	5.48	9.02	15.55	20.28	24	EP
1"	46	613:1	0	0.48	1.27	2.08	4.49	7.79	16.46	28.81	40.60	46	EP
1-1/4"	105	1130:1	0	0.46	2.39	4.90	12.54	21.66	35.34	72.96	96.30	105	EP
1-1/2"	154	1238:1	0	1.55	4.83	7.70	20.93	37.03	64.40	135.24	145.78	154	EP
2"	214	922:1	0	1.82	6.05	15.59	25.15	42.33	92	229	209	214	EP

EP=Equal Percent Characteristic

Dimensional Data

Two-Way



On/Off Assemblies (O)

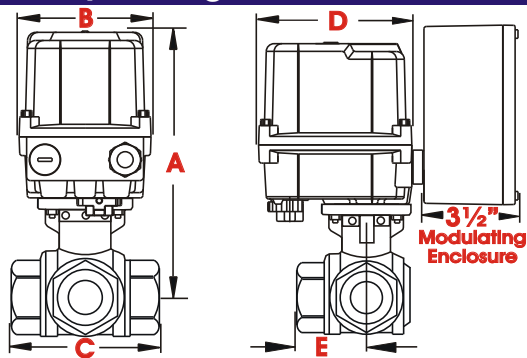
Modulating Assemblies (E)

Standard Assembly, Bronze Body Non-Corroding Chrome Ball and Brass Stem, On/Off 120 VAC, NEMA 4
Modulating Service Change Last O to E in Model #, Accessories See Page 4

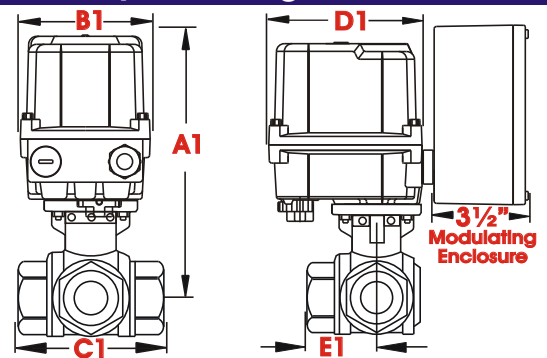
Assembly Specification									On/Off Dimensions ^{inch} For mm multiply: Inch X 25.4=(mm)				Modulating Dimension ^{inch} For mm multiply: Inch X 25.4=(mm)				
C _v	Size In	Close off psi	Model Number	Wt. lb	Amp draw		Speed 90°(sec)		41 Series operator On/Off / Mod.	A	B	C	D	A1	B1	C1	D1
					On/Off	Mod.	On/Off	Mod.									
13	1/2"	600	BV21X2B41O	11	0.4	0.5	12	12	600-02	7 1/4"	4 1/4"	2 1/2"	5"	7 1/4"	4 1/4"	2 1/2"	8 1/2"
24	3/4"	600	BV22X2B41O	11	0.4	0.5	12	12	600-02	7 1/2"	4 1/4"	2 1/2"	5"	7 1/2"	4 1/4"	2 1/2"	8 1/2"
46	1"	600	BV23X2B41O	12	0.4	0.5	12	12	600-02	7 3/4"	4 1/4"	3 5/32"	5"	7 3/4"	4 1/4"	3 5/32"	8 1/2"
105	1 1/4"	600	BV24X2B41O	13	0.4	0.5	12	12	600-02	7 7/8"	4 1/4"	3 9/16"	5"	7 7/8"	4 1/4"	3 9/16"	8 1/2"
154	1 1/2"	600	BV25X2B41O	14	0.4	0.5	12	12	600-02	8 5/8"	4 1/4"	3 15/16"	5"	8 5/8"	4 1/4"	3 15/16"	8 1/2"
214	2"	600	BV26X2B41O	16	0.4	0.5	12	12	600-02	9"	4 1/4"	4 27/32"	5"	9"	4 1/4"	4 27/32"	8 1/2"
503	2 1/2"	600	BV27X2B41O	18	0.4	0.5	12	12	600-02	9 1/8"	4 1/4"	6 1/4"	5"	9 1/8"	4 1/4"	6 1/4"	8 1/2"
734	3"	600	BV28X2B41O	23	0.4	0.5	12	12	600-02	9 1/4"	4 1/4"	7 3/8"	5"	9 1/4"	4 1/4"	7 3/8"	8 1/2"

NOTE: Wiring Under "Electrical Section" Series 41, Tagged with Operator Model Number.

Three-Way Mixing



Three-Way Diverting



Standard Assembly, Bronze Body, Chrome Ball, On/Off, 120 VAC T-Port Mixing or Diverting (For L-Port Diverting Please change T to L in Model#) Modulating Service Change Last O to E in Model #, Accessories See Page 4

Assembly Specification									Mixing ^{inch} For mm multiply: Inch X 25.4=(mm)					Diverting ^{inch} For mm multiply: Inch X 25.4=(mm)					
C _v	Size In	Close off psi	Model Number	Wt. lb	Amp draw		Speed 90°(sec)		41 Series operator On/Off / Mod.	A	B	C	D	E	A1	B1	C1	D1	E1
					On/Off	Mod.	On/Off	Mod.											
13	1/2"	600	BVT1X2B41O	12	0.4	0.5	12	12	600-02	7"	4 1/4"	2 3/4"	5"	1 23/64"	7"	4 1/4"	2 1/2"	5"	1 5/16"
23	3/4"	600	BVT2X2B41O	13	0.4	0.5	12	12	600-02	7 1/4"	4 1/4"	3 1/4"	5"	1 5/8"	7 1/4"	4 1/4"	2 5/8"	5"	1 1/2"
40	1"	600	BVT3X2B41O	14	0.4	0.5	12	12	600-02	7 1/3"	4 1/4"	3 3/8"	5"	1 15/16"	7 1/3"	4 1/4"	3 1/6"	5"	1 9/16"
85	1 1/4"	600	BVT4X2B41O	15	0.4	0.5	12	12	600-02	7 1/2"	4 1/4"	4 3/8"	5"	2 1/4"	7 1/2"	4 1/4"	4"	5"	2 1/4"
88	1 1/2"	400	BVT5X2B41O	16	0.4	0.5	12	12	600-02	8"	4 1/4"	4 7/8"	5"	2 27/64"	8"	4 1/4"	4 1/2"	5"	2 3/8"
88	2"	400	BVT6X2B41O	23	0.4	0.5	12	12	600-02	8 1/2"	4 1/4"	5"	5"	2 17/32"	8 1/2"	4 1/4"	4 7/8"	5"	3 1/4"

NOTE: Wiring Under "Electrical Section" Series 41, Tagged with Operator Model Number.

Water Capacity Sizing Table in Gallons Per Minute, $GPM = C_v \times \sqrt{\Delta p}$

2-way

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
13	1/2"	15	13	18	23	26	29	32	34	37	39	41
24	3/4"	20	24	34	42	48	54	59	63	68	72	76
46	1"	25	46	65	80	92	103	113	122	130	138	145
105	1-1/4"	32	105	148	182	210	235	257	278	297	315	332
154	1-1/2"	38	154	218	267	308	344	377	407	436	462	487
214	2"	50	214	303	371	428	479	524	566	605	642	677
503	2-1/2"	65	503	711	871	1006	1125	1232	1331	1423	1509	1591
734	3"	80	734	1038	1271	1468	1641	1798	1942	2076	2202	2321

3-way T- Port or L-Port Flow Pattern

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
13	1/2"	15	13	18.4	22.5	26.0	29.1	31.8	34	37	39	41
23	3/4"	20	23	32.5	40	46	51	56	61	65	69	73
40	1"	25	40	57	69	80	89	98	106	113	120	126
85	1-1/4"	32	85	120	147	170	190	208	225	240	255	269
88	1-1/2"	38	88	124	152	176	197	216	233	249	264	278
88	2"	50	88	124	152	176	197	216	233	249	264	278

Three-way Flow Pattern / Default

All configurations are bi-directional close off. The mixing and diverting T-Port valves through port is equal percentage and the bypass port is linear and yields 70% of the flow of port A.

• T-Port Default

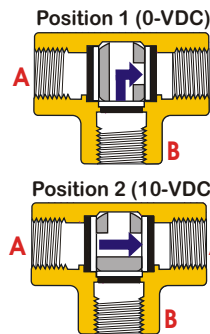
Non-Spring: Assemblies are set up B to AB Open at 0 VDC and will fail in last position, on loss of power

• L-Port Default

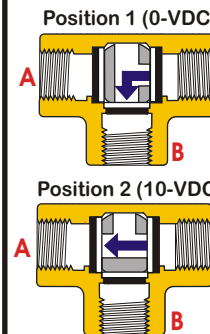
Non-Spring: Assemblies are set up AB to A open at 0 VDC and will fail in last position, on loss of power

Letters on Valve Body Indicate Flow Pattern

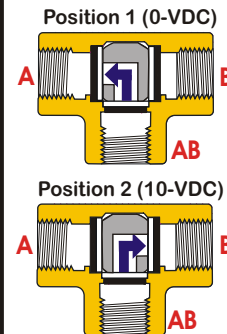
Mixing T-Port



Diverting T-Port

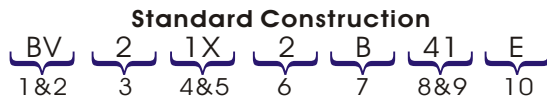


Diverting L-Port



Unless specified position of valve versus volts DC is set up as above

Assembly Number



Accessories



Ball Valve Assembly, 2-Way, 1/2" Full Port, NPT Ends 2-piece design, Bronze Body-Chrome Ball, 120 VAC NEMA 4 Actuator, Non-Spring Return, Modulating 0-10 VDC input

#	ITEM	CODE	DESCRIPTION	#	ITEM	CODE	DESCRIPTION
1 & 2	Series	BV	Ball Valve	6	Valve Type	2	NPT 2-piece Full Port
3	Assembly	2 L T	2-Way Configuration 3-Way L-Port 3-Way T-Port	7	Construction	B	Bronze Body-Chrome Trim
4 & 5	Size	1X 5X 2X 6X 3X 7X 4X 8X	1/2" = 1X 1 1/2" = 5X 3/4" = 2X 2" = 6X 1" = 3X 2 1/2" = 7X 1 1/4" = 4X 3" = 8X	8 & 9	Actuator	41	Non-Spring 120 VAC
				10	Controls	O E	On/Off Modulating 0-10 VDC input
				11 & 12	Accessories	F	Feedback

1) Please Specify 3-way T-Port Mixing or T-Port Diverting.