

BV-F Flanged ANSI 150# FP

Series 41

Ball Valve, Flanged Full Port

Electric 120 VAC - NEMA 4

Description

The BV flanged stainless body Series 41 NEMA 4 electric assemblies are available in two-way and three-way configurations. Assemblies are complete with full port valve and carbon steel mounting kit that is 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

Full port 150# flanged end valve assemblies are powered by 120 VAC, NEMA 4 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 contains 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
- Self Locking worm gear and segment is permanently lubricated and will not back drive
- 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
- Agency approved listings CE
- 2 year limited warranty

Valve Performance

- 150# ANSI flanged full port design, split body construction
- PTFE V-ring packing is used in the shaft area for low sealing force requirement and excellent leak control
- Pressure equalization at the top of the ball with special seat design, balances line pressure and body cavity pressure
- Encapsulated graphite body seal maintains leak free seal between the two piece split body
- Blow-out proof stem prevents removal of stem when valve is in service
- Glass filled Teflon seats for extended pressure and temperature
- Valve body is ANSI rated 150# for 285 psi @ ambient temp
- Valve close off is 285 psi maximum bi-directional
- True floating ball design lowers torque, ensures positive close off
- 1 year limited warranty

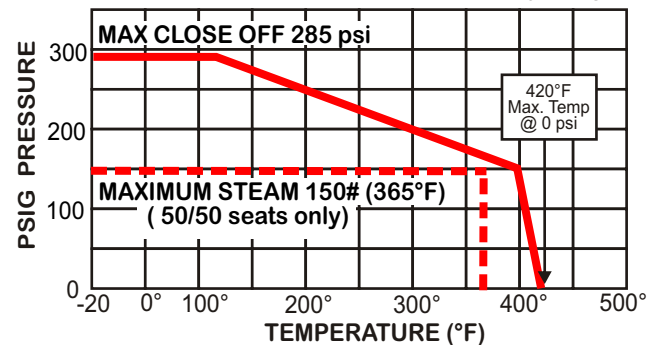
Assembly Default

- 2-way valves with non-spring return modulating actuators will be closed at 0 VDC and fail in last position on loss of power

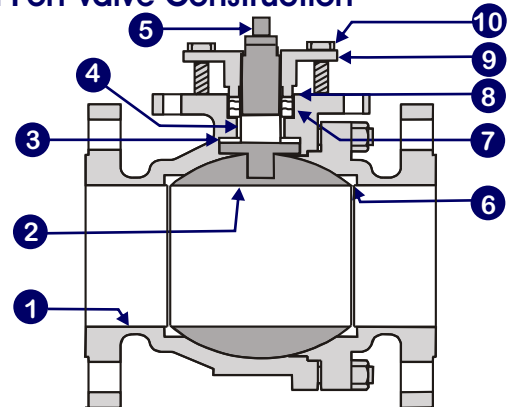


Pressure Temperature

ANSI 150# Body Rating



Full Port Valve Construction



NOTE: Valves Have Raised Face Flanged Ends And Require Gasketing Material

Item	Description	Materials	Item	Description	Materials
1	Body	Stainless	6	Ball Seat	Glass Filled PTFE
2	Ball	Stainless	7	Stem Packing	Virgin PTFE
3	Stem Seal	Glass Filled PTFE	8	Gland Bushing	Virgin PTFE
4	Stem Bearing	Glass Filled PTFE	9	Gland	Stainless
5	Stem	Stainless	10	Gland Bolts	ASTM A193 B8

Full Port

The BV stainless flanged Series 41 assemblies incorporates several design features for improved performance in HVAC / industrial applications. Valves comply with ANSI B16.5 standards for end to end dimensions and flanged end bolting requirements. The valve body construction is cast two-piece stainless steel and meets design standards of MSS-SP-72. Testing and inspections are performed throughout the valve production process including pressure testing in conformance to API 598 to ensure integrity of the shell and seals. The large diameter ball has an increased bore opening for maximum flow capacity. The PTFE seats are glass filled and are held in place by grooves cast in the valve body that fully encapsulate the seats and eliminate cold flowing under adverse pressure and temperature. A graphite body seal ensures sealing integrity between the two-piece split body.

The control advantages when using the full port 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 150#, provide an ideal valve for temperature control in building automation systems or industrial applications.

Floating Ball Design

The full port flanged ball valves offer downstream sealing, and bi-directional flow. This is obtained by allowing pressure to pass by the upstream seat through relief slots, and the ball being floated downstream to affect bubble - tight close off. The benefit is lower friction, less operating torque, smaller actuator and longer service life.

PTFE Packing Material

PTFE is the primary material used for packing because of the relatively low sealing force requirement, excellent emission control and good chemical and thermal resistance.

Anti-Static Device

Internal parts that are insulated from the valve body by seats and seals made of nonconductive materials may build up a static electric charge. To ensure electrical continuity between the stem, ball and the body flange, valves feature a anti-static device as an integral part of the valves construction.

Equal Percentage Flow Characteristics

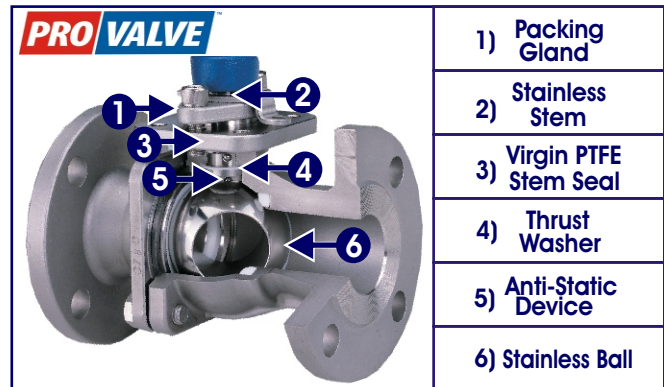
A round hole seat cooperating with a round hole bore in a valve ball typically achieves a equal percent flow characteristic. The like movements of the stem at any point of the flow range will change the existing flow in equal increments.

Quality Control

Series 41 non-spring return actuators are low-profile, durable and lightweight in design. One basic foot print accommodates the entire size range from 1/2" - 6". Simplified wiring configurations allow for faster installations. Actuators contain high torque reversible electric motors with built in automatic resetting thermal overload protection. All models utilize a combination of a worm and segment gear drive thus eliminating the need for a brake.

Additional features include:

- ◆ Motors are custom built for high-torque and low current draw
- ◆ Standard built-in auxiliary switches, start span adjustable
- ◆ Enclosure certified NEMA 4 type
- ◆ Dual 3/4" conduit connections
- ◆ Actuators contain heaters for dissipation of condensation
- ◆ Standard manual override with handwheel on all models
- ◆ Capacitors are sealed and rated for peak voltage for extended Service



Operating Conditions

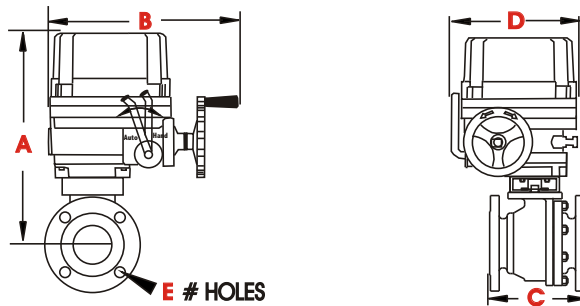
- Temp Range: (see pressure/temp chart front page)
- Close Off: 285 psi Max at Ambient Temp
- ANSI 150# Body Rating
- Steam Rating: 150 psi Maximum (50/50 seats)
- Chilled or Hot Water, Glycol up to 50%
- Bi-directional Close Off - ANSI Class 6



Model 700

Dimensional Data

Two-Way

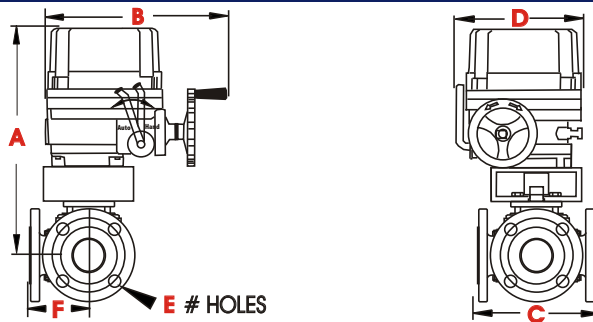


Standard Assembly, All Stainless Valve, Full Port 150#, 120 VAC, NEMA 4 Actuator, On/Off Modulating Service Change Last O to E in Model #, Accessories See Page 4

C _v	Assembly Specification		Close Off psi	Model Number	Wt. lb	Amp draw		Speed 90° (sec.)		41 Series operator	Assembly Dimensions inch				
	Size In	DN				On/Off	Mod.	On/Off	Mod.		On/off / Mod.	A	B	C	D
28	1/2"	15	285	BV21ZFA41O	32	1.7	1.7	21	75	700-01	14 1/2"	10 3/4"	4 1/4"	9"	4
52	3/4"	20	285	BV22ZFA41O	33	1.7	1.7	21	75	700-01	14 3/4"	10 3/4"	4 5/8"	9"	4
90	1"	25	285	BV23ZFA41O	36	1.7	1.7	21	75	700-01	15"	10 3/4"	5"	9"	4
250	1 1/2"	38	285	BV24ZFA41O	42	1.7	1.7	21	75	700-01	15 3/4"	10 3/4"	6 1/2"	9"	4
480	2"	50	285	BV202FA41O	48	1.7	1.7	21	75	700-01	16"	10 3/4"	7"	9"	4
680	2 1/2"	65	285	BV225FA41O	59	1.7	1.7	21	75	700-01	17 1/4"	10 3/4"	7 1/2"	9"	4
1200	3"	80	285	BV203FA41O	69	1.7	1.7	21	75	700-02	18 1/4"	10 3/4"	8"	9"	4
2250	4"	100	285	BV204FA41O	112	1.9	1.9	26	75	700-03	20 1/4"	12"	9"	10 1/4"	8
5400	6"	150	285	BV206FA41O	216	3.7	3.7	26	75	700-06	22"	12"	15 1/2"	10 1/4"	8
9600	8"	200	285	BV208FA41O	475	4.2	4.2	31	75	700-12	23"	16 1/8"	18"	11 5/8"	8

NOTE: 1) Wiring Under "Electrical Section" Series 41, Tagged with Operator Model Number.

Three-Way



Std. Assembly, All Stainless 150# Flanged Valve, 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

T-Port	L-Port	Assembly Specification		Close Off psi	Model Number	Wt. lb	Amp draw		Speed 90° (sec.)		41 Series operator	Assembly Dimensions inch					
		Size In	DN				On/Off	Mod.	On/Off	Mod.		On/off / Mod.	A	B	C	D	E
198	50	1 1/2"	38	285	BVT4ZFA41O	65	1.7	1.7	21	75	700-01	16 1/2"	10 3/4"	8 3/8"	9"	4	4 3/16"
315	120	2"	50	285	BVT02FA41O	85	1.7	1.7	21	75	700-01	18"	10 3/4"	8 2/32"	9"	4	4 1/3"
643	158	2 1/2"	65	285	BVT25FA41O	130	1.9	1.9	26	75	700-01	20"	12"	9 1/4"	10 1/4"	4	4 5/8"
1170	275	3"	80	285	BVT03FA41O	145	1.9	1.9	26	75	700-02	22"	12"	10 59/64"	10 1/4"	4	5 27/64"
1930	422	4"	100	285	BVT04FA41O	200	3.7	3.7	26	75	700-03	22 1/2"	12"	13"	11 3/4"	8	6 1/2"
4914	788	6"	150	285	BVT06FA41O	350	4.2	4.2	31	75	700-06	26 1/2"	16 1/8"	16 15/16"	11 3/4"	8	8 5/32"

NOTE: 1) Wiring Under "Electrical Section" Series 41, 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
28	1/2"	15	28	40	48	56	63	69	74	79	84	89
52	3/4"	20	52	74	90	104	116	127	138	147	156	164
90	1"	25	90	127	156	180	201	220	238	255	270	285
250	1-1/2"	40	250	354	433	500	559	612	661	707	750	791
480	2"	50	480	679	831	960	1073	1176	1270	1358	1440	1518
690	2-1/2"	65	690	976	1195	1380	1543	1690	1826	1952	2070	2182
1200	3"	80	1200	1697	2078	2400	2683	2939	3175	3394	3600	3795
2250	4"	100	2250	3182	3897	4500	5031	5511	5953	6364	6750	7115
5400	6"	150	5400	7637	9353	10900	12075	13227	14287	15274	16200	17076

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

Saturated Steam Capacity Sizing Table in Pounds Per Hour

Inlet pressure	15#		30#		45#		60#		75#		90#		105#		120#		135#		150#	
	C _v	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
28	546	1224	940	1853	1324	2475	1705	3097	2086	3719	2465	4341	2844	4963	3223	5585	3602	6206	3980	6828
52	1015	2274	1745	3442	2459	4597	3167	5752	3873	6906	4578	8061	5282	9216	5986	10371	6689	11526	7392	12681
90	1756	3935	3020	5957	4255	7956	5482	9955	6704	11953	7924	13952	9143	15951	10360	17950	11578	19949	12794	21948
250	4878	10930	8389	16547	11821	22099	15227	27652	18622	33204	22011	38757	25396	44309	28779	49862	32160	55414	35540	60967
480	9366	20986	16106	31769	22695	42430	29236	53091	35754	63752	42261	74413	48761	85074	55255	95735	61747	106395	69237	117056
690	13463	30168	23153	45668	32625	60993	42027	76318	51397	91643	60750	106968	70093	122293	79430	137618	88762	152943	98090	168268
1200	23414	52466	40265	79423	56739	106076	73090	132728	89386	159380	105652	186032	121901	212684	138139	239336	154368	265989	170592	292641
2250	43901	98374	75497	148919	106385	198892	137043	248865	167599	298837	198098	348810	228565	398783	259010	448756	289440	498729	319860	548701
5400	105362	236098	181194	357405	255324	477340	328904	597275	402237	717210	475436	837144	548556	957079	621624	3170399	694657	1196948	767665	1316883

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 compressibility of high or low pressure steam for precision control. For modulating with less than 15 psig steam, it is best to use 80% of gauge inlet pressure. For higher pressure steam greater than 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.

Three-way Flow Pattern / Default	Mixing T-Port	Diverting T-Port	Diverting L-Port
<p>All configurations are bi-directional close off. The mixing and diverting T-Port valves through port is equal percentage and the</p> <ul style="list-style-type: none"> T-Port Default <i>Non-Spring:</i> Assemblies are set up B to AB Open at 0 VDC and will fail in last position, on loss of power L-Port Default <i>Non-Spring:</i> Assemblies are set up AB to A open at 0 VDC and will fail in last position, on loss of power <p>Letters on Valve Body Indicate Flow Pattern</p>	<p>Position 1 (0-VDC)</p> <p>Position 2 (10-VDC)</p>	<p>Position 1 (0-VDC)</p> <p>Position 2 (10-VDC)</p>	<p>Position 1 (0-VDC)</p> <p>Position 2 (10-VDC)</p>
	Unless specified position of valve versus volts DC is set up as above		

Assembly Number

Standard Construction

Accessories



Ball Valve Assembly, 2-Way, 1/2" Full Port 150# Flanged Ends, All Stainless Body and Ball, 120 VAC NEMA 4 Actuator, Non-Spring Return, Modulating 0-10 VDC or 4-20 MA input.

#	ITEM	CODE	DESCRIPTION	#	ITEM	CODE	DESCRIPTION
1 & 2	Series	BV	Ball Valve	7	Construction	A	All Stainless
3	Assembly	2 L T	2-Way Configuration 3-Way L-Port 3-Way T-Port	8 & 9	Actuator	41	Non-Spring 120 VAC
4 & 5	Size	1Z 25 2Z 03 3Z 04 4Z 06 02	1/2" = 1Z 3/4" = 2Z 1" = 3Z 1 1/2" = 4Z 2" = 02	10	Controls	O E	On/Off Modulating 0-10 VDC / 4-20 ma
6	Valve Type	F	Flanged 150# Full Port	11 & 12	Accessories	F	Feedback

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