

VBB/VBS Series Ball Valve Assemblies



Application

The VBB and VBS Series valves with SmartX Actuators are 2-Way or 3-Way, 1/2" or 3/4", characterized ball valves. The M3 and M2 SmartX Actuators are direct coupled to the VBB/VBS Series valves and accept two-position, floating or proportional control signals from a DDC system, controller, or thermostat for control of hot or chilled water, or solutions of up to 60% glycol. Typical applications include VAV reheat, fan coil units, hot and chilled water coils in air handling units, heat pumps and unit ventilators.

Features

- Easy product selection — all actuators fit all valve bodies.
- Fast, easy actuator installation — no linkage or tools required.
- Flow characterizing insert provides equal percentage flow characteristic for stable, accurate floating and proportional control.
- ANSI IV seat leakage (0.01%) for both 2-Way and 3-Way valves (A and B port).
- Brass and stainless steel trim models.
- Cvs from 0.3...10.
- Normally open, normally closed, and non-spring return assemblies available.
- Two-position, Floating or Proportional (0...5 Vdc, 0...10 Vdc, 5...10 Vdc, or 4...20 mA dc).
- Proportional actuator is direct or reverse acting.
- RoHS Compliant (VBS Assemblies).
- Reach Compliant.

Applicable Literature

- VBB and VBS Series Two-position Spring-Return Ball Valves Installation Instructions, F-27392.
- VBB and VBS Series Floating Spring Return and Non-spring Return Ball Valves Installation Instructions, F-27393.
- VBB and VBS Series Proportional Spring Return and Non-spring Return Ball Valves Installation Instructions, F-27394.
- VBB and VBS Series Brochure, F-27681.
- EN-205 Water System Guidelines, F-26080.
- EN-206 Guidelines for Powering Multiple Actuators, F-26363.

Specifications

Actuator

Voltage	24 Vac for floating and proportional 100...277 Vac for two position multi-voltage types	
Power Requirements	See Table-1, Table-2, and Table-3.	
Control Signal	2-Position, Floating, or Proportional; half wave rectified power supply	
Timing, Full Open to Full Close	See Table-1, Table-2 and Table-3.	
Manual Operating Lever / Position Indicator	Standard on all models.	
Auxiliary End Switch (optional)	SPST 24 Vac/Vdc, 101 mA...5 A max.	
Materials	Thermoplastic base and cover. Approved for use in air plenums.	
Shipping & Storage Temperature Limit	-40...169 °F (-40...76°C).	
Operating Temperature Limit at max fluid temp.	Floating	32...140 °F (0...60 °C)
	Proportional	32...140 °F (0...60 °C)
	Two-Position	32...169 °F (0...76 °C)
	Humidity	5...95% relative humidity, non-condensing.
Locations	NEMA 2, IEC IP31. Indoor Use Only.	

Valve

Service ^a	Hot and chilled water, up...60% glycol.
System Static Pressure Limit	600 psi (4137 kPa).
Fluid Temperature Limit	20...250°F (-7...121°C).
Cv (Kv)	See Tables 4 through 7.
Close-off Pressure ^b	130 psi 2-Way; 70 psi 3-Way
Differential Pressure	30 psi normal operation 20 psi quiet operation.
Seat Material	PTFE
Characterized Insert	Glass-filled PEEK
Seat Leakage	ANSI class IV (0.01%) at both A and B ports with pressure at inlet.
End Connections	NPT threaded (VBxxNxx)
Rangeability	Greater than 300:1.
Body Material	Forged brass.
Stem Material	Stainless steel anti-blow out stem with dual Viton™ o-rings.
Ball Material	Chrome plated brass (VBB series) or stainless steel (VBS series).

a. Not rated for steam service.

b. Close-off is defined as the maximum allowable pressure drop to which a valve may be subjected while fully closed.

Agency Listings

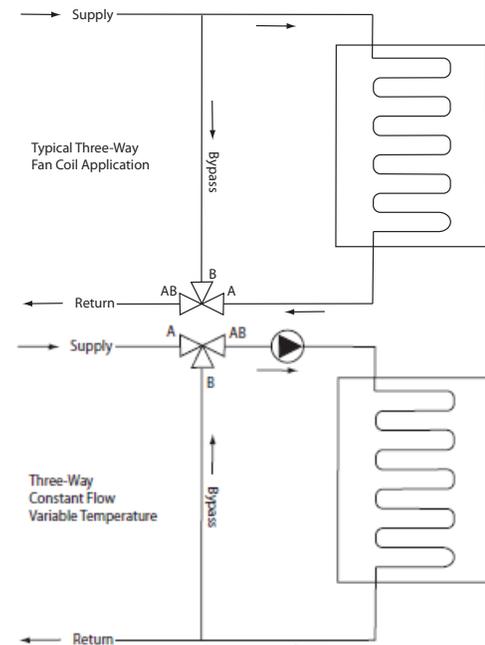
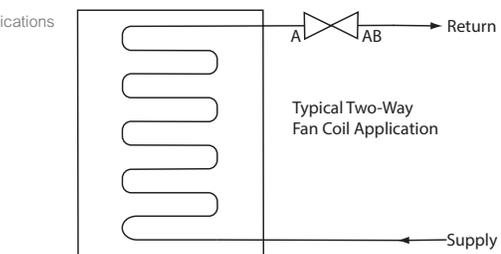
M2 SmartX actuators	North America: c-UL-us LISTED per UL 873 and C22.2 No.24. European Union: LVD 2006/95/EC and EMC 2004/108/EC directives compliant.
M3 SmartX actuators:	North America: c-UL-us LISTED per UL 60730-1 & -2-14 and CSA E60730-1 & -2-14. FCC part15 classB & ICES-003 classB emissions compliant. European Union: LVD 2014/35/EU and EMC 2014/30/EU directives, per EN 60730-1 & -2-14. EN 61000-6-2 immunity & EN 61000-6-3 emissions compliant.
Australia	This product meets requirements to bear the RCM Mark.
Plenum Rating	Actuators with terminal block or plenum cable leads are plenum rated.
CRN Number	CRN OC0970.9012345678NTY.
RoHS Compliant	VBS valves and M3/M2 actuators comply with European Directive RoHS 2 Directive 2011/65/EU. Please consult factory for part number specific compliance.
REACH Compliant	Compliant as defined in Article 33 of the REACH Regulation (EC)1907/2006.

Application Schematics

Typical applications

For simplicity, balancing valves and control devices are not shown.

Mixing applications



Ball Valve Assembly Selection Procedure

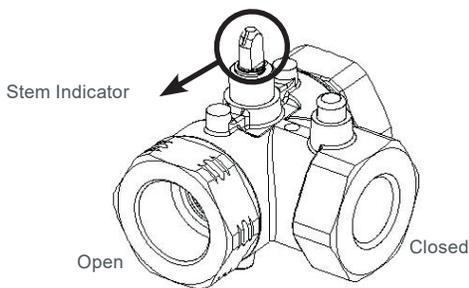
1. Select the actuator. When selecting a ball valve assembly, you must know the control signal type and voltage to first select an actuator. Consult the following tables: Table-1 covers two-position actuator specifications and model numbers, Table-2 covers floating actuator specifications and model numbers and Table-3 covers proportional actuator specifications and model numbers.
2. Select the valve body. The valve body model number is selected based on the line size (1/2" or 3/4"), ball material trim, and flow coefficient (Cv/Kv) required. Consult Table-4 and Table-5 for brass trim valve body specifications and model numbers and Table-6 and Table-7 for stainless steel trim valve body specifications and model numbers. See "Flow Coefficient Selection" for information in determining the flow coefficient.

Other considerations

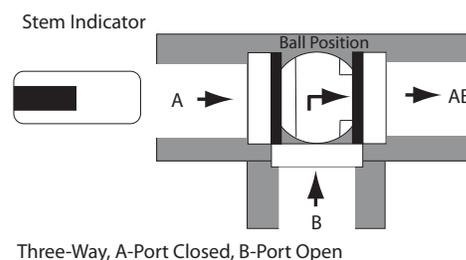
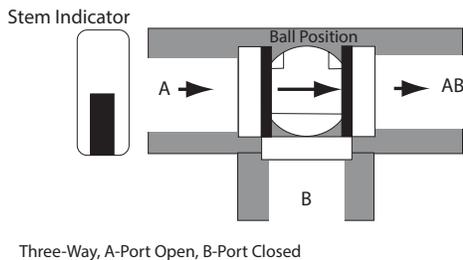
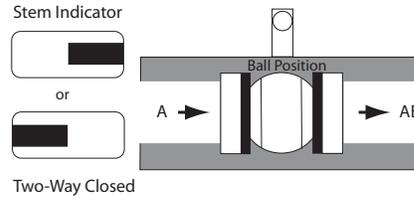
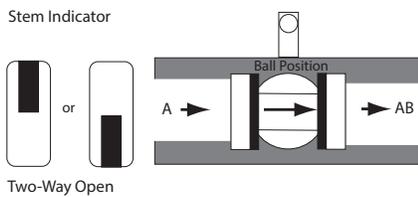
1. General service conditions: Make sure the actuator is suitable for the anticipated ambient conditions and that the valve body is compatible with the system fluid temperature and pressure requirements.
2. Close-off pressure: Confirm that the VBB/VBS ball valve's close off rating is suitable for the valve control application.
3. Space requirements: If mounting space limitations are a consideration, check the actuator/valve assembly dimensions.
4. Pipe reducers: Refer to Tables for estimating effective Cvs when using pipe reducers.
5. Ordering information. You may order the actuator and valve body separately or as a factory assembly. To order a complete valve and actuator assembly, specify the valve body part number and the actuator part number separated by a "+." Example: To order actuator valve body VBB2N15 and M312A00 as a factory valve/actuator assembly, specify VBB2N15+M312A00.

Flow Direction

A notch cut into the stem indicator at the tip of the valve stem is an external indicator of where the closed portion of the ball sits internally. Check the notch position prior to assembling the actuator to verify the ball is orientated in the correct plane.



In the drawings below, the black mark on the stem indicator represents this stem notch.



Product Selection: Actuators

Table-1: Two-Position Actuators

Part Number	Control Signal	Spring Return Action (Valve Normal Position)	VA / Voltage	Leads	Stroke Timing ^g	Spring Return Timing ^g	End Switch		
M210A00	Two-Position	Normally Open	3.5/1.8 at 24 Vac/24 Vdc	Removeable Terminal Block ^b	50 sec	35 sec.			
M210A01				10 ft. (3.05 m) Plenum Cable ^c			SPST		
M210A11									
M210A02				18 in. (45 cm) Appliance Wire			SPST		
M210A12									
M210M02				18 in. (45 cm) Appliance Wire			SPST		
M210M12									
M220A00		Normally Closed	3.5/1.8 at 24 Vac/24 Vdc	6.0/6.0 at 100...277 Vac, 50/60 Hz			Removeable Terminal Block ^b		
M220A01							10 ft. (3.05 m) Plenum Cable ^c	SPST	
M220A11									
M220A02							18 in. (45 cm) Appliance Wire	SPST	
M220A12									
M220M02							18 in. (45 cm) Appliance Wire	SPST	
M220M12									

Table-2 Floating Actuators

Part Number	Control Signal	Spring Return Action (Valve Normal Position)	VA @ 24 Vac 50/60 Hz	Leads	Stroke Time, sec. 50/60 Hz	Time-out Delay, sec. 50/60 Hz
M332A00	Floating	None	2.3/2.4	Terminal Block ^b	159/135	181 Sec
M332A01				10 ft. (3.05 m) Plenum Cable ^c		
M312A00		Normally Open	3.2/3.3 ^d	Terminal Block ^b		
M312A01				10 ft. (3.05 m) Plenum Cable ^c		
M322A00		Normally Closed		Terminal Block ^b		
M322A01				10 ft. (3.05 m) Plenum Cable ^c		

Table-3 Proportional Actuators

Part Number	Control Signal	Spring Return Action (Valve Normal Position)	VA @ 24 Vac 50/60 Hz	Leads	Stroke Time, sec. 50/60 Hz	Time-out Delay, sec. 50/60 Hz
M333A00	Proportional ^a (Vdc : 0...5, 0...10, 2...10, 5...10, 4...20 mA dc ^e)	None	2.7/2.8	Terminal Block ^b	159/135	200/166
M333A01				10 ft. (3.05 m) Plenum Cable ^c		
M313A00		Normally Open	2.7/2.8 ^d	Terminal Block ^b		
M313A01				10 ft. (3.05 m) Plenum Cable ^c		
M323A00		Normally Closed		Terminal Block ^b		
M323A01				10 ft. (3.05 m) Plenum Cable ^c		

- a. Default configured for 0...10 Vdc input signal, direct acting control.
- b. All terminal block and appliance wire units accept a 1/2" conduit connector fitting (.875" diameter).
- c. All plenum cable units include an integral 3/8" conduit connector fitting.
- d. Size transformer for 10 VA per actuator.
- e. For 4...20 mA control, a separate isolated transformer must be used with each valve.
- g. Nominal.