

BMF1.03(S)Z / BBF1.03(S)Z / BAF1.03(S) / BAF2.03(S)

Spring Return Actuators

Product Bulletin

The BxFx.03(S)(Z) Series Electric Spring Return Actuators are direct-mount actuators.

These bidirectional actuators are used to provide accurate positioning on JVx05 Series DN15 up to DN25 all valves in Heating, Ventilating and Air Conditioning (HVAC) applications.

One Integral line voltage auxiliary switch, available only on the BxFx.03S(Z) models, indicate end-stop position, or perform switching functions within the selected rotation range.

A graduated scale from 0% to 100% and a position indicator provide visual indication of the valve's opening.

When power fails during service, the mechanical spring return system open or close the valve ports.

The series includes the following control options:

- ON/OFF, 24 V AC/DC, 100 to 240 VAC power
- ON/OFF and Floating Point, 24 V AC/DC power
- Proportional, 24 V AC/DC power, for 0(2) to 10 VDC or 0(4) to 20 mA Control

■ 3 Nm Rated Torque

Expands the range of JVx05 Ball Valve applications to include DN15, DN20 and DN25 sizes.

■ Mechanical Spring Return System

Provides the most reliable mechanism sold today, with no batteries to fail, wear out, or replace.

■ Direct-Coupled Design

Requires no separate linkage because the BxFx.03(S)(Z) Series Actuators are ready for direct attachment to JVx05 Series valves by driving one captive screw.

■ Reversible Mounting

Provides either clockwise or counterclockwise operation.

■ Rugged IP54 Rated Enclosure

Provides a high degree of protection from dust, splashing water, and rough handling.

■ Electronic Stall Detection

Protects from overload at all angles of rotation and reduces power consumption in holding mode.

■ Double-Insulated Construction

Requires no electrical ground connection for regulatory agency compliance.

■ Microprocessor Controlled Brushless DC Motor (BBF1.03Z and BMF1.03Z Models)

Provides constant runtime independent of torque.

■ External Mode Selection Switch (BBF1.03Z and BMF1.03Z Models)

Permits control logic reversal for Floating Control (BBF1.03Z models) and permits calibration, input signal range selection, and control logic reversal for Proportional Control (BMF1.03Z models).

■ Integral Cables with Colored and Numbered Conductors

Simplify installation and field wiring.

■ Optional Integrated Auxiliary Switch

Provides one integrated line-voltage-capable Single-Pole, Double-Throw (SPDT) switch (continuously adjustable switch point) that facilitates safety interfacing or signaling.

■ Override Control (Proportional Models Only)

Provides manual control system override applications through field wiring.

■ UL, CE, and C-Tick Compliance

Provides internationally recognized regulatory agency approval.

■ Manufacturing under International Standards Organization (ISO) 9001 Quality Control Standards.

Ensures quality control standards.



BMF1 mounted on JV305

BMF1.03(S)Z Series Proportional Actuators

BMF1.03(S)Z Series Actuators provide proportional modulation of Ball Valves that are controlled by an electronic controller or positioner. The actuator responds to 0 to 10 VDC or 2 to 10 VDC control signals. With the addition of a 500 ohm resistor, the actuator responds to a 0 to 20 mA or 4 to 20 mA signal. A 0 to 10 VDC or 2 to 10 VDC feedback signal indicates position and provides support for master slave applications.

BMF1.03(S)Z Series Actuators use a brushless DC motor controlled by a microprocessor. The microprocessor drives the motor at constant speed, independent of torque. The microprocessor also monitors the brushless DC motor's rotation to prevent damage to the actuator in a stall condition. The actuator can be stalled anywhere within its rotation range without the need for mechanical end switches. Power consumption is reduced in the holding mode.

Manual control system override applications are supported through field wiring, and include:

- override to MIN position
- override to MAX position
- override to MIN, MID, and MAX position.

Setup and Adjustments

Mode Selection Switch

Actuators have an external mode selection switch to calibrate, select input signal range, and reverse control logic.

The switch is accessible from both A and B sides of the actuator as illustrated in Figure 4. Actuators are delivered in Direct Acting (DA), DC 0 to 10 V input signal mode.

To change to Reverse Acting (RA) mode, move the mode selection switch from DA to RA (see figure 1). The input signal range is selectable between DC 0 to 10 V or DC 2 to 10 V.

If the CAL function is not used, both input signal ranges are proportioned across the full rotation range of 0 to 100% rotation. For example, if a DC 0 to 10 V input signal is selected and the rotation range is limited to 75°, the rotation range limit will be reached at DC 8.3 V.



Figure 1: Mode Selection

Control Response

The installation side of the actuator and the position of the mode selection switch combine to determine control response from the actuator.

		Installation Side						
		A	B					
Input Signal	Mode Selection Switch							
Increasing								
Decreasing								
		Rotation Position						
Direction	Feedback	0°*	15°	30°	45°	60°	75°	90°
Direct Acting	0-10 V	0.0 V	1.7 V	3.3 V	5.0 V	6.7 V	8.3 V	10.0 V
	2-10 V	2.0 V	3.3 V	4.7 V	6.0 V	7.3 V	8.7 V	10.0 V
Reverse Acting	0-10 V	10.0 V	8.3 V	6.7 V	5.0 V	3.3 V	1.7 V	0.0 V
	2-10 V	10.0 V	8.7 V	7.3 V	6.0 V	4.7 V	3.3 V	2.0 V

* 0° is the Spring Return Position.

Figure 2: BMF1.03S(Z) - Control Response

Calibration (CAL) Function

The CAL function enables the actuator to redefine the selected input signal range proportionally across a reduced rotation range. The actuator maintains calibration when power is lost or removed.

Follow these steps to calibrate the input signal range:

1. With power applied to the actuator, move the mode selection switch to the CAL position and leave it in this position for approximately 5 seconds. The actuator begins rotating until the end-stops are found.
2. Move the mode selection switch to the desired input signal range. Selection can be made while the calibration process is in progress, or after it is complete. The selected input signal is proportionally reconfigured to the reduced rotation range.

Note: During normal operation, if the actuator stroke increases due to seal or seat wear, input signals are automatically reconfigured to the increased rotation range in approximately 0.5° increments.

3. If the actuator mounting position is changed or if the linkage is adjusted, repeat Step 1 and Step 2 to repeat the CAL function.

Note: The mode selection switch must remain out of the CAL position for at least 2 seconds before re-initiating the CAL function.

Note: If the mode selection switch is left in the CAL position, the actuator defaults to 0-10 V input signal range, DA.

BBF1.03(S)Z Series ON/OFF and Floating Point Actuators

BBF1.03(S)Z Series Actuators provide on/off control or floating modulation of in HVAC systems. Floating point control is provided from a triac or relay. On/off control can be provided from a manual switch, controller, auxiliary switch from a fan motor contactor, or similar device.

BBF1.03(S)Z Series Actuators use a brushless DC motor controlled by a microprocessor.

The microprocessor drives the motor at constant speed, independent of torque. The microprocessor also monitors the brushless DC motor's rotation to prevent damage to the actuator in a stall condition.

The actuator can be stalled anywhere within its rotation range without the need for mechanical end switches. Power consumption is reduced in the holding mode. Actuators have an external mode selection switch to reverse control logic. The switch is accessible from both A and B sides of the actuator. Actuators are delivered in Direct Acting (DA) mode and can be switched by the user to Reverse Acting (RA) mode.

Control Response

The installation side of the actuator and the position of the mode selection switch combine to determine control response from the actuator.

Control Inputs		Mode Selection Switch			
GRY	ORN	A		B	
3	4	DA	RA	RA	DA
CLOSED	OPEN	↘	↙	↘	↙
OPEN	CLOSED	↙	↘	↙	↘
OPEN	OPEN	STOP	STOP	STOP	STOP
CLOSED	CLOSED	↘	↙	↘	↙

Figure 3: BBF1.03S(Z) - Control Response

BAFx.03(S) Series ON/OFF Actuators

BAFx.03(S) Series Actuators provide on/off control of Ball valve. On/off control can be provided from a manual switch, controller, auxiliary switch from a fan motor contactor, or similar device.

BAFx.03(S) Series Actuators use a DC brush motor controlled by analog electronics.

Power consumption is reduced in the holding mode. Two different voltage ratings are available for On/ Off Actuators:

- BAF1.03(S): AC 24 V 50/60 Hz or DC 24 V power
- BAF2.03(S): AC 100 to AC 230 V 50/60 Hz power

The BAF2.03(S) actuators are double-insulated so an electrical ground is not required.

Auxiliary Switch

The BxFx.03S models include one integral auxiliary switch with a switch adjuster accessible on either face of the actuator.

The factory setting for the Auxiliary Switch is 10% closing (relative to the 0 to 100% rotation range as printed on the product label). The switch point continuously adjustable throughout the actuator's rotation range.

For the most accurate switch positioning, see Figure 4 and use the method in the following example.

To change the switch point, proceed as follows:

1. Position the actuator in the full spring return position.
 - Note:** Note: The switch is factory set to trip when the actuator reaches the 10% position.
2. Rotate the switch adjuster until it points to the desired switch point.
3. Connect the Auxiliary Switch to a power source or an ohmmeter and apply power to the actuator. The actuator moves to the fully open position and holds while power is applied.
4. Observe the switch point. If required, repeat Step 1 through Step 3.

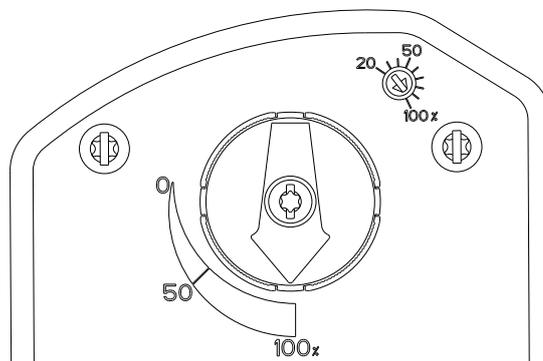


Figure 4: Switch Trip Point Settings

Mounting

Install the ball valve with the actuator at or above the center line of the horizontal piping.



WARNING:

In steam applications, install the valve with the stem horizontal to the piping. Failure to follow this precaution may shorten the life of the actuator.



WARNING:

Do not install or use this actuator in or near environments where corrosive substances or vapors could be present. Exposure of the actuator to corrosive environments may damage the device's internal components, and will void the warranty.

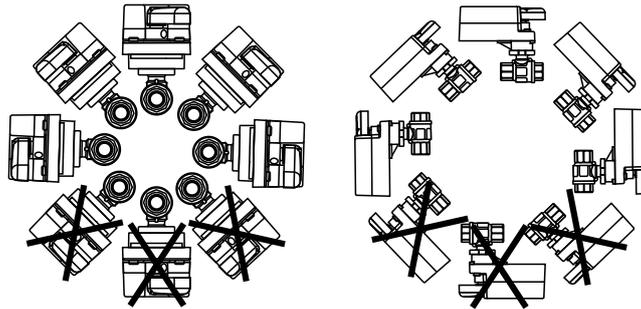


Figure 5: Mounting Positions for Chilled Water and Condensing Atmosphere Applications

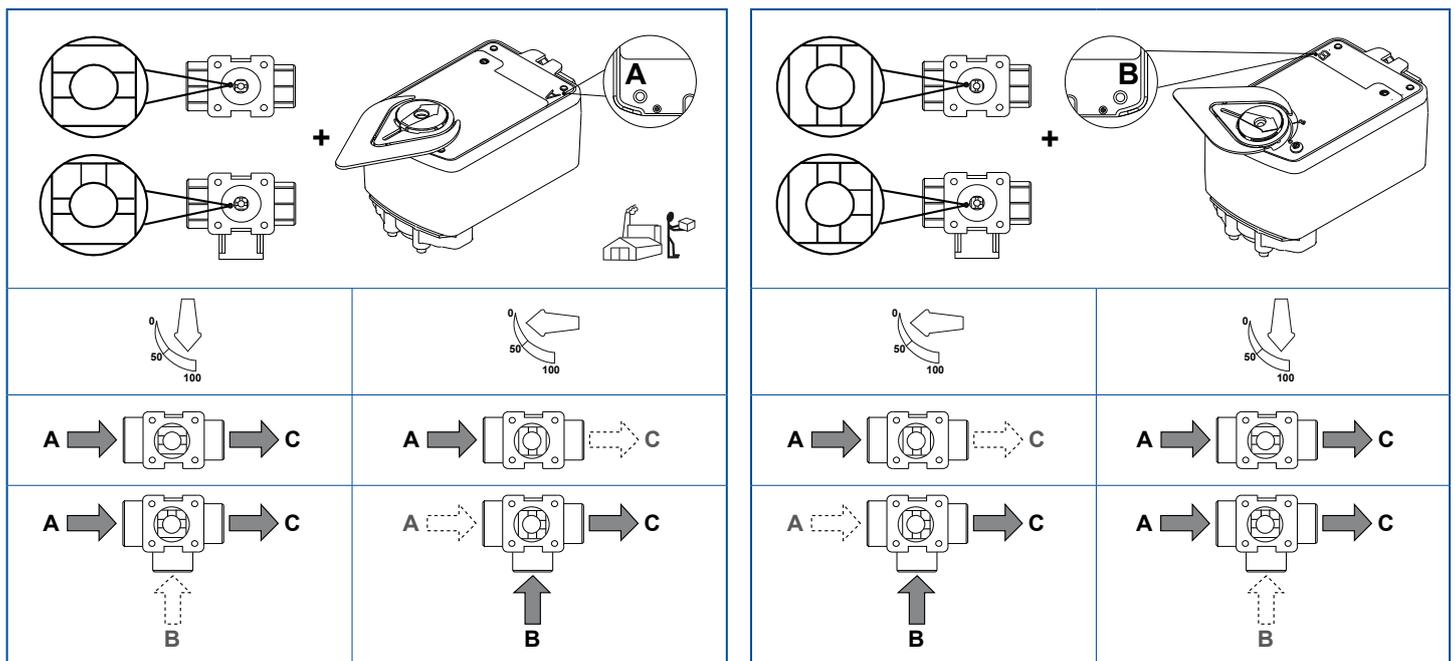


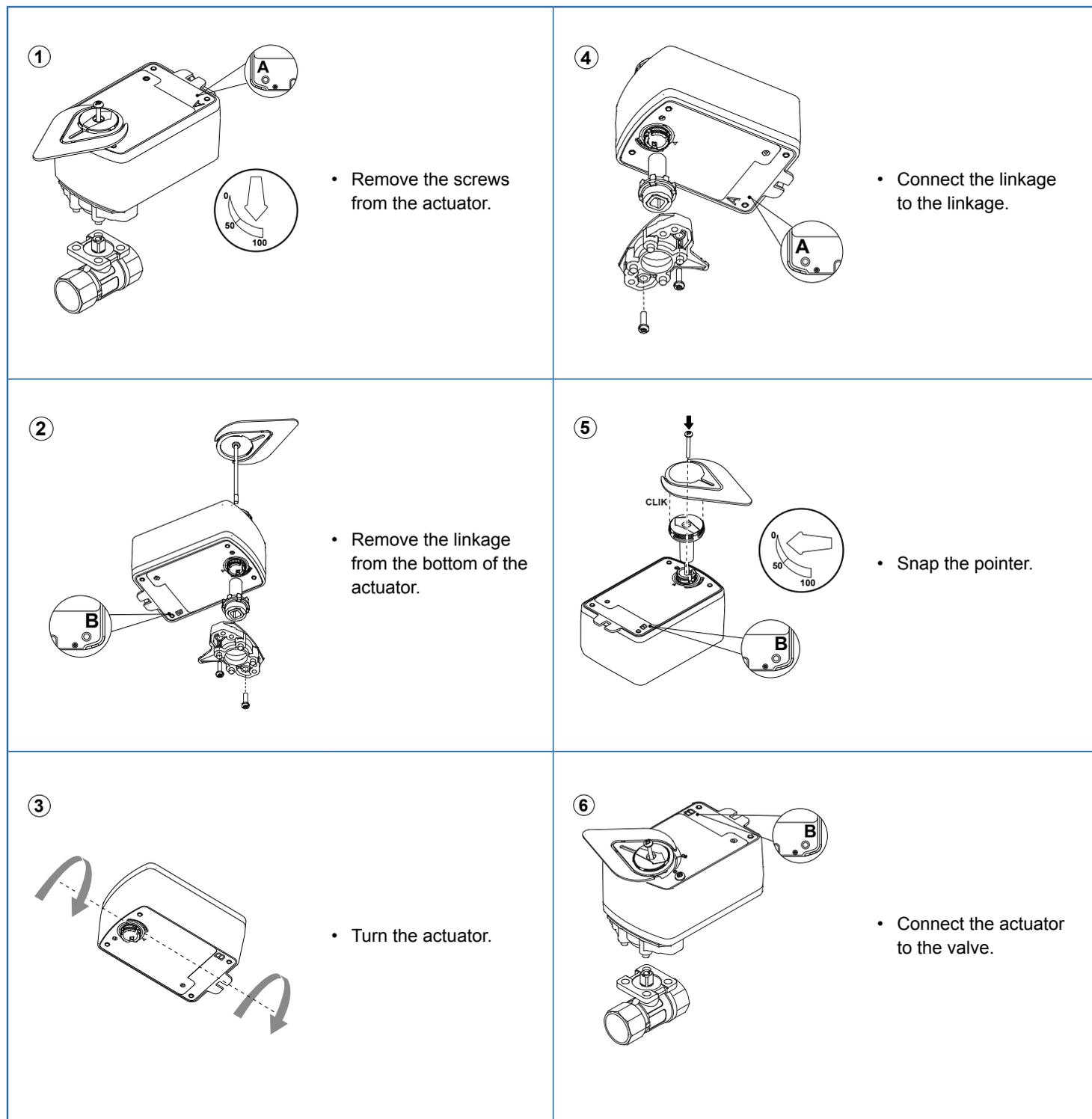
Figure 6: Spring open configuration

Figure 7: Spring close configuration

The actuators are delivered ready to be direct connected on a JVx05 in a "Spring Open Configuration"; the spring of the actuator, without power applied, connects port A with port C (see Figure 6). To link the actuator on the valve in a spring open configuration turn the valve stem to the position outlined in Figure 6, install the actuator on the valve tightening the mounting screw. The linkage must be on actuator Side B.

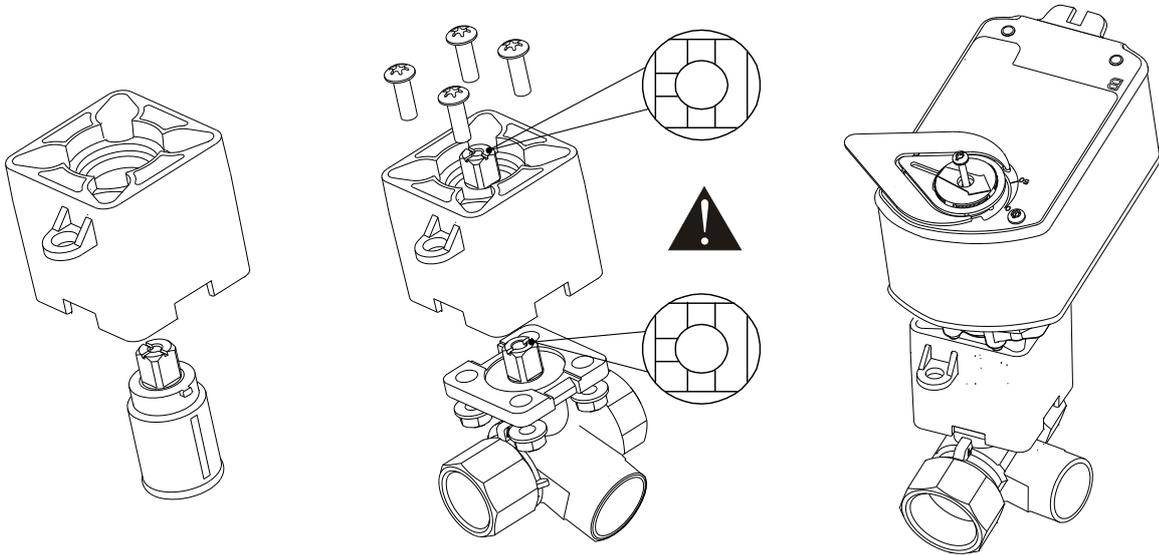
In the "Spring Close Configuration" the spring of the actuator, without power applied, closes port A with port C (see Figure 7). To link the actuator on the valve in a spring close configuration, turn the valve stem to the position outlined in Figure 7, install the actuator on the valve tightening the mounting screw. The linkage must be on actuator Side A.

If it is necessary to change the position of the linkage from one side to the other, proceed as follow:



M9000-561 Thermal Barrier

The Thermal barrier optional kit extends the application of the BxFx.03(S)(Z) actuators in combination with JVx05 ball valves. Linking together valve and actuator using the M9000-561 you can include applications with low pressure steam up to 123 °C at 103kPa (250 °F at 15 psig) and hot water up to 140 °C (284 °F).



Wiring Diagrams

DC 0(2)...10 V Control

0(4)...20 mA Control

Master-Slave Application

Override to 100% position

FUNCTION	A
100%	✓
NORMAL	✓

Override to 0% position

FUNCTION	B	C
0%	✓	✓
NORMAL	✓	✓

Override to 0%-50%-100% positions

FUNCTION	A	B	C
100%	✓	✓	✓
50%	✓	✓	✓
0%	✓	✓	✓
NORMAL	✓	✓	✓

Floating Control, 4 Wire

Open/Close, Single Wire Control

Floating Control, Parallel Connection

On/Off Control, 2 Wire

BBF1.03(S)Z

BAF1.03(S)

~ AC 24 V 50/60
+ DC 24 V

BAF2.03(S)

N L1
AC 85...264 V 50/60 Hz

BMF1.03(S)Z

BAF1.03(S)

BAF2.03(S)

Dimensions

Valve Actuator

See Table 1 and Figure 8 for the dimensions of the BxFx.03(S)(Z) Series Actuated Ball Valves.

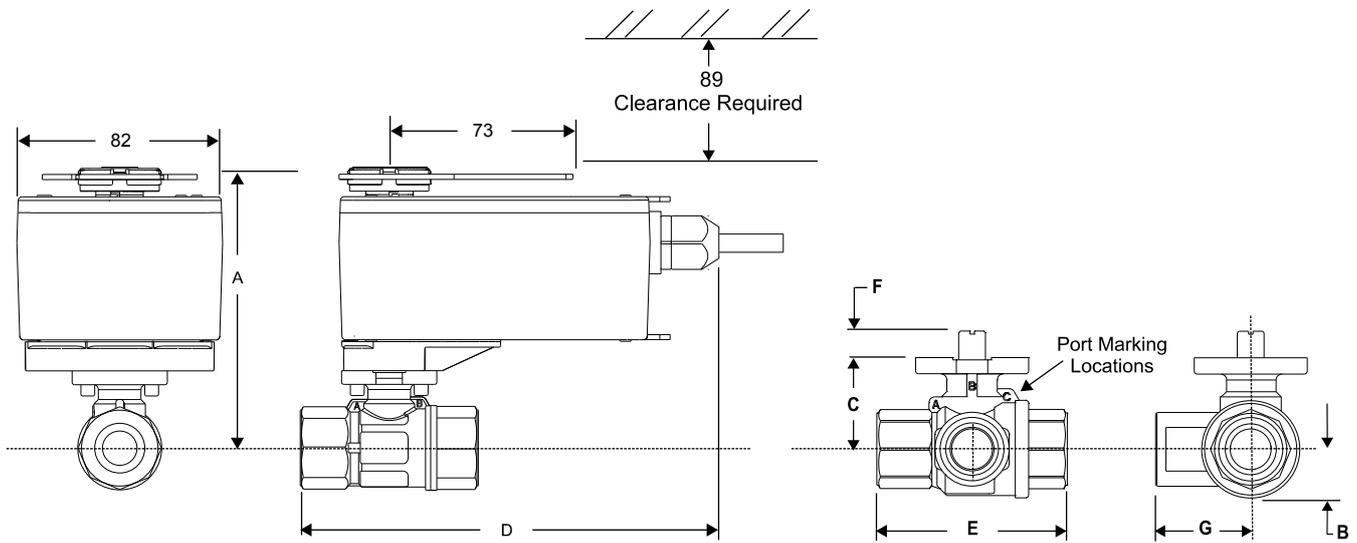


Figure 8: Spring Return BxFx.03(S)(Z) Actuated JV205 and JV305 Series Ball Valve Dimensions, in mm

Table 1: BxFx.03(S)(Z) Actuated JV205 and JV305 Series Ball Valve Dimensions, in mm

Valve Size, mm (DN)	A	B	C	D	E	F	G
DN15	117	17	31	167	67	9	33
DN20	117	17	31	171	75	9	38
DN25	119	19	33	180	92	9	46

Valve Actuator

See Table 2 and Figure 9 for valve actuator dimensions with optional M9000-561 thermal barrier installed.

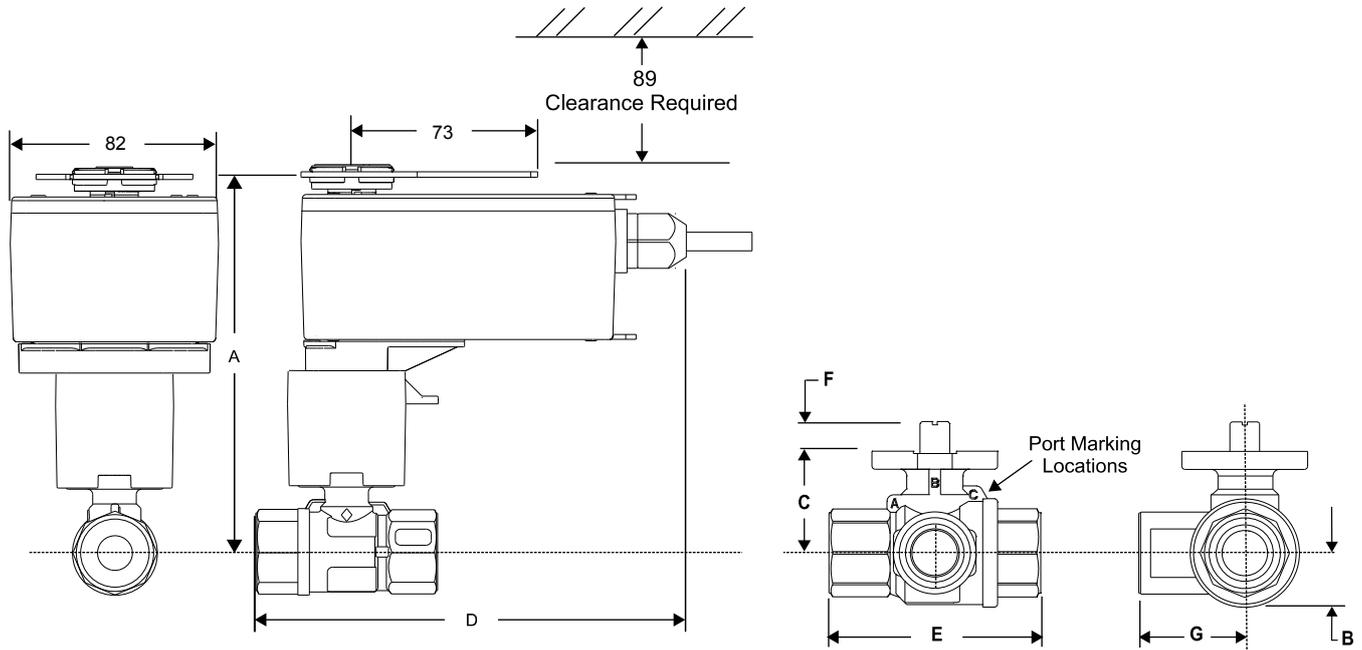


Figure 9: Spring Return BxFx.03(S)(Z) Actuated JV205 and JV305 Series Ball Valve with Optional M9000-561 Thermal Barrier Installed Dimensions, in mm

Table 2: BxFx.03(S)(Z) Actuated JV205 and JV305 Series NPT Ball Valve with Optional Thermal Barrier Installed Dimensions, in mm

Valve Size, mm (DN)	A	B	C	D	E	F	G
DN15	152	17	31	167	67	9	33
DN20	152	17	31	171	75	9	38
DN25	154	19	33	180	92	9	46

Ordering Code

Table 3: BxFx.03 Spring Return Actuators

Code Number	Description
BMF1.03Z	3 Nm Spring Return Actuator for Valves, Proportional, 24 V AC/DC
BMF1.03SZ	3 Nm Spring Return Actuator for Valves, Proportional, 24 V AC/DC, 1 Switch
BBF1.03Z	3 Nm Spring Return Actuator for Valves, Floating & ON/OFF, 24 V AC/DC
BBF1.03SZ	3 Nm Spring Return Actuator for Valves, Floating & ON/OFF, 24 V AC/DC, 1 Switch
BAF1.03	3 Nm Spring Return Actuator for Valves, ON/OFF, 24 V AC/DC
BAF1.03S	3 Nm Spring Return Actuator for Valves, ON/OFF, 24 V AC/DC, 1 Switch
BAF2.03	3 Nm Spring Return Actuator for Valves, ON/OFF, 100 to 230 V AC
BAF2.03S	3 Nm Spring Return Actuator for Valves, ON/OFF, 100 to 230 V AC, 1 Switch

Table 4: Accessory (Order Separately)

Code Number	Description
M9000-200	Commissioning Tool that Provides a Control Signal to Drive 24 V On/Off, Floating, Proportional, and/or Resistive Electric Actuators
M9000-560	Ball Valve Linkage Kit for applying 3 Nm and 8 Nm Series Actuators to JVx05 Series Valves (quantity 1)
M9000-561	Thermal Barrier Extends 4 Nm, 3 Nm and 8 Nm Series Electric Spring Return Actuator applications to include low pressure steam (quantity 1)
M9000-341	Weathershield Kit for JVx05 Series Ball Valve application of 4 Nm, 3 Nm and 8 Nm Series Electric Spring Return Actuators (quantity 1)
M9000-607	Position Indicator for JVx05 Series Ball Valve Applications (Quantity 5)

Technical Specifications

BBF1.03S(Z) Series On/Off and Floating Point Electric Spring Return Actuator

Actuator	BBF1.03Z	BBF1.03SZ
Power Requirements	AC 24 V (AC 19.2 V to 28.8 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 5.1 VA Running, 2.8 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.9 W Running, 1.1 W Holding Position Minimum Transformer Size: 6 VA per Actuator	
Input Signal / Adjustment	AC 19.2 to 28.8 V at 50/60 Hz or DC 24 V +20%/-10% Class 2 (North America) or SELV (Europe) Minimum Pulse Width: 500 msec	
Control Input Impedance	4,700 ohm Control Inputs	
Auxiliary Switch Rating	---	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with Silver Contacts: AC 24 V, 50 VA Pilot Duty AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty
Spring Return	Direction is Selectable with Mounting Position of Actuator: Actuator Face Labeled A Is Away from Valve: CCW Spring Return Actuator Face Labeled B Is Away from Valve: CW Spring Return	
Rated Torque - Power On (Running) - Power Off (Spring Returning)	3 Nm All Operating Temperatures 3 Nm All Operating Temperatures	
Rotation Range	Maximum Full Stroke: 95°	
Rotation Time for 90 Degrees of Travel - Power On (Running) - Power Off (Spring Returning)	90 Seconds Constant for 0 to 3 Nm Load, at all Operating Conditions 12 to 17 Seconds for 0 to 3 Nm Load, at Room Temperature 16 Seconds Nominal at Full Rated Load 22 Seconds Maximum with 3 Nm Load, at -30 °C (-22 °F)	
Life Cycles	60,000 Full Stroke Cycles with 3 Nm Load 1,500,000 Repositions with 3 Nm Load	
Audible Noise Rating - Power On (Running) - Power On (Holding) - Power Off (Spring Returning)	<37 dBA at 3 Nm Load, at a Distance of 1 m <20 dBA at a Distance of 1 m <56 dBA at 3 Nm Load, at a Distance of 1 m	
Electrical Connections	1.2 m UL 758 Type AWM Halogen Free Cable with 18 AWG (0.85 mm ²) Conductors and 6 mm Ferrule Ends	
Fluid Temperature Limits -JV205 and JV305 Series -JV205 and JV305 Series with M9000-561	-30 to 100 °C (-22 to 212 °F), Not Rated for Steam Service -30 to 140 °C (-22 to 284 °F) water; 103 kPa (15 psig) at 121 °C (250 °F) Saturated Steam	
Enclosure Rating	IP54 (NEMA 2) for all Mounting Orientations	
Ambient Conditions - Standard Operating - Storage	-30 to 60 °C (-22 to 140 °F); 90% RH Maximum, Noncondensing -40 to 85 °C (-40 to 185 °F); 95% RH Maximum, Noncondensing	
Dimensions	See tables	
Shipping Weight	0.9 kg	1.1 kg

BAFx.03S Series ON/OFF Electric Spring Return Actuator

Actuator	BAF1.03(S)	BAF2.03(S)
Power Requirements	AC 24 V (AC 19.2 V to 28.8 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 5 VA Running, 1.6 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 2.8 W Running, 0.8 W Holding Position Minimum Transformer Size: 6 VA per Actuator	AC 100 V to 240 V (AC 85 V to 264 V) at 50/60 Hz: 0.06 A Running, 0.02 A Holding Position
Auxiliary Switch Rating <i>- BAFx.03S Models only</i>	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with Silver Contacts: AC 24 V, 50 VA Pilot Duty AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty	
Spring Return	Direction is Selectable with Mounting Position of Actuator: Actuator Face Labeled A Is Away from Valve: CCW Spring Return Actuator Face Labeled B Is Away from Valve: CW Spring Return	
Rated Torque <i>- Power On (Running)</i> <i>- Power Off (Spring Returning)</i>	3 Nm All Operating Temperatures 3 Nm All Operating Temperatures	
Rotation Range	Maximum Full Stroke: 95°	
Rotation Time for 90 Degrees of Travel <i>- Power On (Running)</i> <i>- Power Off (Spring Returning)</i>	53 to 71 Seconds Constant for 0 to 3 Nm Load, at Room Temperature 60 Seconds Nominal at Full Rated Load (0.25 rpm) 19 to 23 Seconds for 0 to 3 Nm Load, at Room Temperature 22 Seconds Nominal at Full Rated Load 28 Seconds Maximum with 3 Nm Load, at -30 °C (-22 °F)	
Life Cycles	60,000 Full Stroke Cycles with 3 Nm Load	
Audible Noise Rating <i>- Power On (Running)</i> <i>- Power On (Holding)</i> <i>- Power Off (Spring Returning)</i>	<36 dBA at 3 Nm Load, at a Distance of 1 m <20 dBA at a Distance of 1 m <51 dBA at 3 Nm Load, at a Distance of 1 m	
Electrical Connections <i>- Actuator (All Models)</i> <i>- Auxiliary Switches (BAFx.03S Models)</i>	1.2 m UL 758Type AWM Halogen Free Cable with 18 AWG (0.85 mm ²) Conductors and 6 mm Ferrule Ends 1.2 m UL 758Type AWM Halogen Free Cable with 18 AWG (0.85 mm ²) Conductors and 6 mm Ferrule Ends	
Fluid Temperature Limits <i>-JV205 and JV305 Series</i> <i>-JV205 and JV305 Series with M9000-561</i>	-30 to 100 °C (-22 to 212 °F), Not Rated for Steam Service -30 to 140 °C (-22 to 284 °F) water; 103 kPa (15 psig) at 121 °C (250 °F) Saturated Steam	
Enclosure Rating	IP54 (NEMA 2) for all Mounting Orientations	
Ambient Conditions <i>- Standard Operating</i> <i>- Storage</i>	-30 to 60 °C (-22 to 140 °F); 90% RH Maximum, Noncondensing -40 to 85 °C (-40 to 185 °F); 95% RH Maximum, Noncondensing	
Dimensions	See tables	
Shipping Weight <i>- BAFx.03 Models</i> <i>-BAFx.03S Models</i>	0.9 kg 1.1 kg	

BMF1.03 Series Proportional Electric Spring Return Actuator

Actuator	BMF1.03Z	BMF1.03SZ
Power Requirements	AC 24 V (AC 19.2 V to 28.8 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 4.7 VA Running, 2.7 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.8 W Running, 1 W Holding Position Minimum Transformer Size: 6 VA per Actuator	
Input Signal / Adjustment	Factory Set at DC 0 to 10 V, CW Rotation with Signal Increase Selectable DC 0 (2) to 10 V or 0 (4) to 20 mA with Field -Furnished 500 ohm 0.25 W Minimum Resistor Switch Selectable Direct or Reverse Action with Signal Increase	
Control Input Impedance	Voltage Input: 100,000 ohm Current Input: 500 ohm with Field Furnished 500 ohm Resistor	
Feedback Signal	DC 0 (2) to 10 V for Desired Rotation Range up to 95° Corresponds to Rotation Limits, 0.5 mA at 10 V Maximum	
Auxiliary Switch Rating	---	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with Silver Contacts: AC 24 V, 50 VA Pilot Duty AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty
Spring Return	Direction is Selectable with Mounting Position of Actuator: Actuator Face Labeled A Is Away from Valve: CCW Spring Return Actuator Face Labeled B Is Away from Valve: CW Spring Return	
Rated Torque - Power On (Running) - Power Off (Spring Returning)	3 Nm All Operating Temperatures 3 Nm All Operating Temperatures	
Rotation Range	Maximum Full Stroke: 95° Adjustable Stop: 35° to 95° Maximum Position	
Rotation Time for 90 Degrees of Travel - Power On (Running) - Power Off (Spring Returning)	90 Seconds Constant for 0 to 3 Nm Load, at all Operating Conditions 12 to 17 Seconds for 0 to 3 Nm Load, at Room Temperature 16 Seconds Nominal at Full Rated Load 22 Seconds Maximum with 3 Nm Load, at -30 °C (-22 °F)	
Life Cycles	60,000 Full Stroke Cycles with 3 Nm Load 1,500,000 Repositions with 3 Nm Load	
Audible Noise Rating - Power On (Running) - Power On (Holding) - Power Off (Spring Returning)	<37 dBA at 3 Nm Load, at a Distance of 1 m <20 dBA at a Distance of 1 m <56 dBA at 3 Nm Load, at a Distance of 1 m	
Electrical Connections	1.2 m UL 758Type AWM Halogen Free Cable with 18 AWG (0.85 mm ²) Conductors and 6 mm Ferrule Ends	
Fluid Temperature Limits -JV205 and JV305 Series -JV205 and JV305 Series with M9000-561	-30 to 100 °C (-22 to 212 °F), Not Rated for Steam Service -30 to 140 °C (-22 to 284 °F) water; 103 kPa (15 psig) at 121 °C (250 °F) Saturated Steam	
Enclosure Rating	IP54 (NEMA 2) for all Mounting Orientations	
Ambient Conditions - Standard Operating - Storage	-30 to 60 °C (-22 to 140 °F); 90% RH Maximum, Noncondensing -40 to 85 °C (-40 to 185 °F); 95% RH Maximum, Noncondensing	
Dimensions	See tables	
Shipping Weight	0.9 kg	1.1 kg

Compliance

 - United States	UL Listed, CCN XAPX, File E27734; to UL 60730-1A: 2003-08, Ed. 3.1, Automatic Electrical Controls for Household and Similar Use; and UL 60730-2-14: 2002-02, Ed. 1, Part 2, Particular Requirements for Electric Actuators.
 - Canada	UL Listed, CCN XAPX7, File E27734; to UL 60730-1:02-CAN/CSA: July 2002, 3rd Ed., Automatic Electrical Controls for Household and Similar Use; and CSA C22.2 No. 24-93 Temperature Indicating and Regulating Equipment.
 - Europe	CE Mark – Johnson Controls, Inc., declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.
 - Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant