

Non Spring Return Actuators for Ball Valves

Joventa

Product Bulletin

The New Series Electric Non Spring Return Actuators are used to provide accurate positioning on Joventa® JVx05 Series DN15 up to DN50 ball valves in Heating, Ventilating and Air Conditioning (HVAC) applications.



- **Automatic Signal Input Detection model On/Off, Floating and Proportional**
Increase availability at distributors. Simplify retrofit.
- **High speed actuator model**
Allow applications in loop that require a quick response time.
- **Optional Auxiliary Switch & potentiometer feedback**
Provides line voltage capable single Pole Double-Throw (SPDT) switch and 140Ω, 1KΩ, 2KΩ or 10KΩ feedback potentiometric.
- **Direct-Coupled Design**
Requires no separate linkage because they are ready for direct attachment to Johnson Controls JVx05 Series valves by driving one captive screw.
- **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. The actuator may be stalled anywhere in its rotation range without the need for mechanical end switches.
- **Microprocessor-controlled Brushless DC Motor**
Provides constant runtime independent of torque and increases life cycle by reducing wear.

Installation

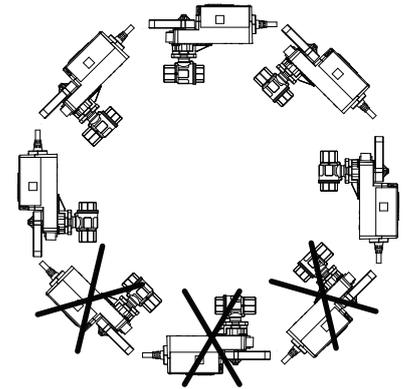
Install the ball valve with the actuator at or above the center line of the horizontal piping.



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.

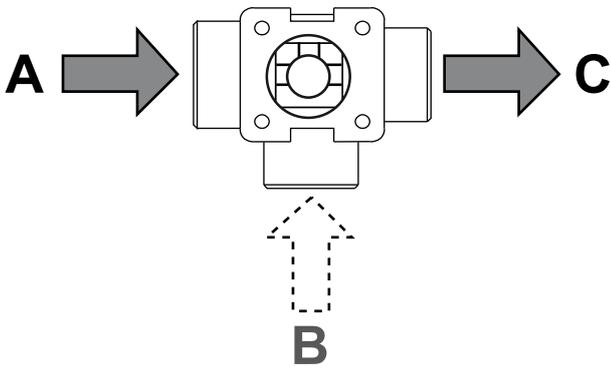
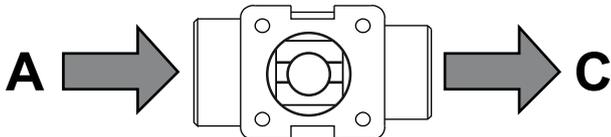


WARNING: Do not install or use this actuator in or near environments where corrosive substances or vapors could be present. Exposure of the actuator to corrosive environments may damage the device's internal components, and will void the warranty.

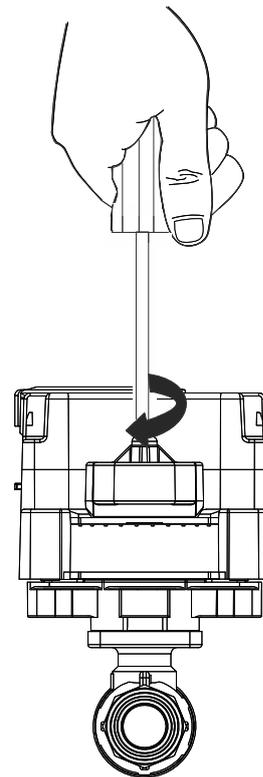
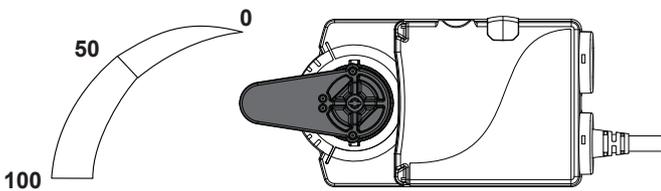


Mounting the actuator Inline to the Valve

1. Make sure the valve stem is inline to the valve Openings.
2. Verify that the actuator handle is inline to the actuator.
3. Place the actuator inline into the valve.
4. Tighten the actuator handle to the valve.

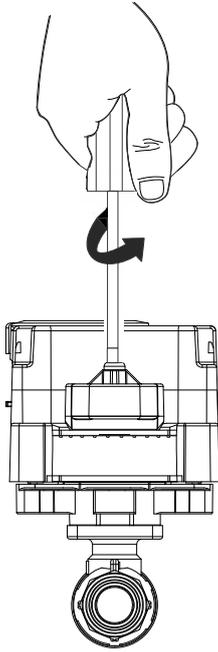


2. Verify that the actuator handle is inline to the actuator.

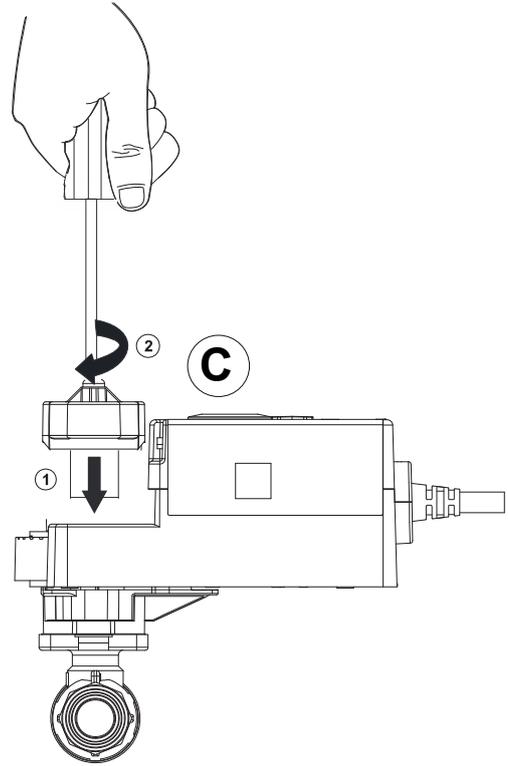


Mounting the Actuator Perpendicular to the Valve

1. Loosen but do not remove the screw that holds the actuator to the valve.



5. Reinsert the handle perpendicular into the actuator and tighten the handle screw.

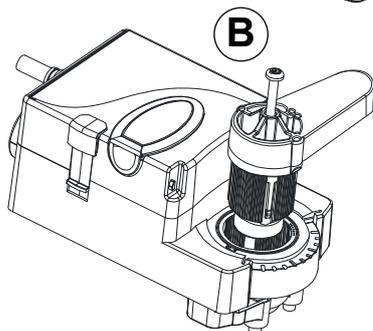
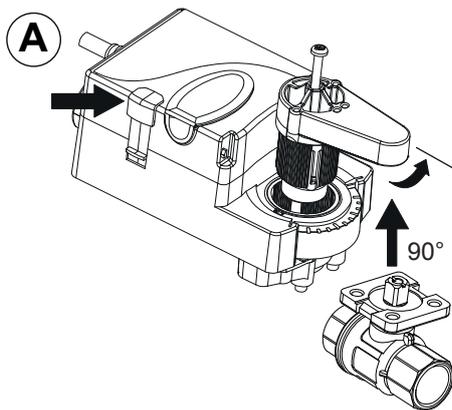


2. Remove the actuator from the valve.

3. Press and hold the gear release.

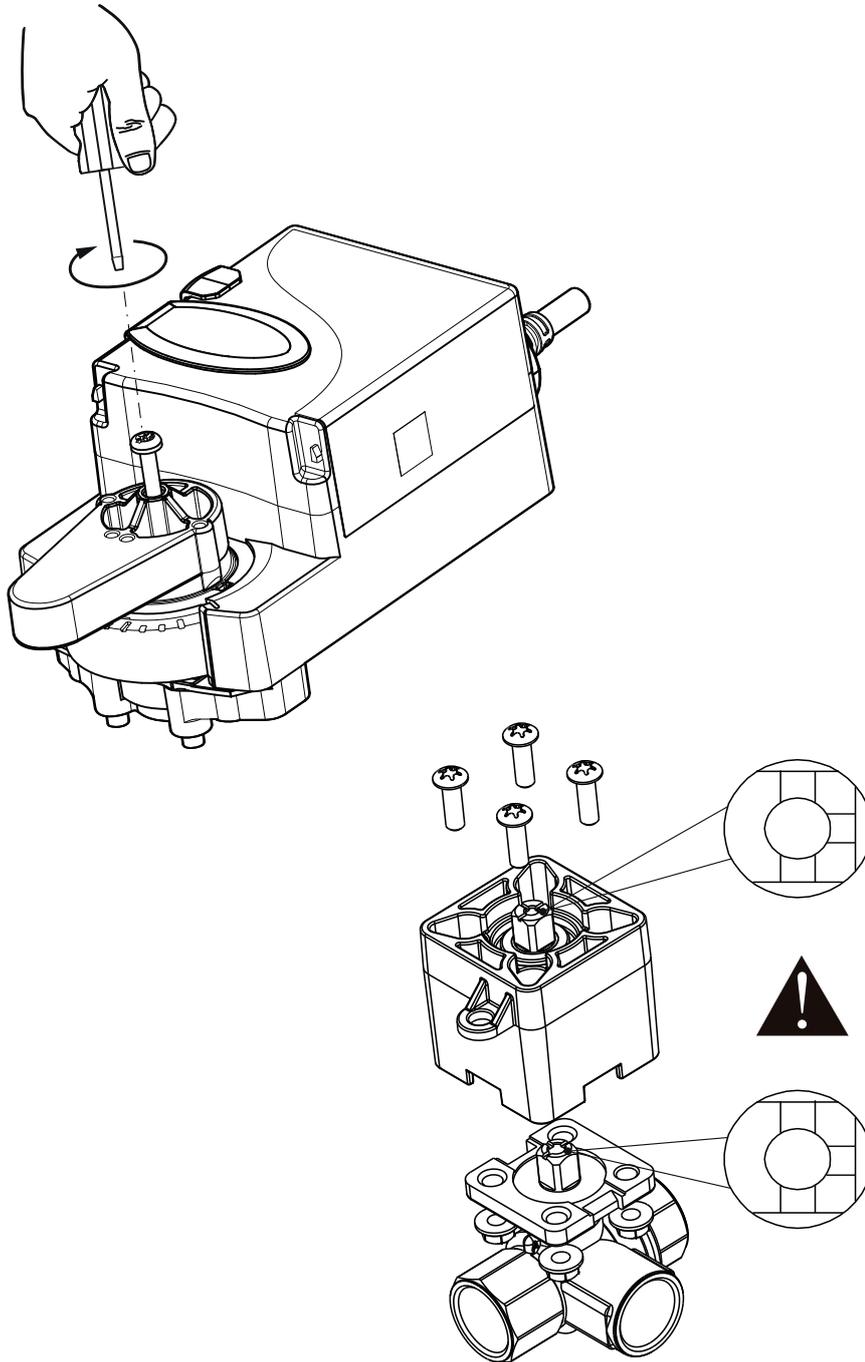
The actuator should be against the internal CCW stop.

4. Lift the handle out of the actuator and rotate 90° counterclockwise.



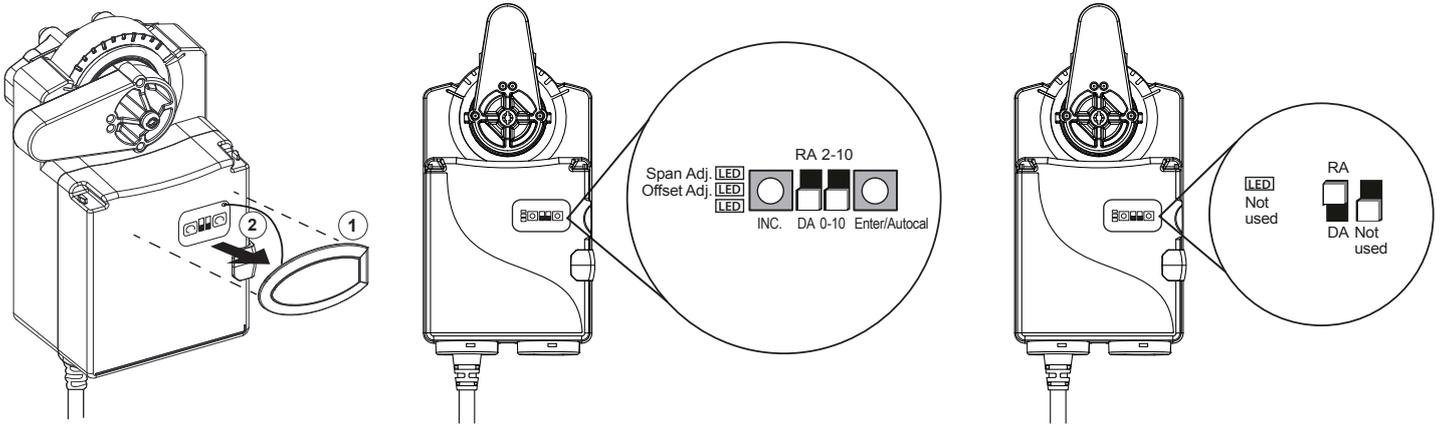
M9000-561 Thermal Barrier

The Thermal barrier optional kit extends the application of these 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).



Accessing the DIP Switches

Locate the oval cover on the front of the unit and pull the cover outward. See further paragraph for viewing the DIP switches and LEDs meaning.



Remove the oval cover

BMS1.10
DIP Switches and LEDs Placement

BAS1.08Z / BAS2.08Z / BAS2.10
DIP Switches and LEDs Placement

Automatic Signal Input Detection model

BMS1.10 Actuator operates with 24 VAC/DC to provide 10 Nm rated torque. The actuator can be used with on/off, floating, or proportional controllers in HVAC systems that are controlled by an electronic controller or positioner.

The actuator has 35 seconds constant runtime for 95° rotation, independent of supply voltage frequency and load. When combined with other actuators in a control system, this option provides flexibility in synchronizing the movement of equipment driven from a single proportional command.

When the BMS1.10 Actuator is in proportional mode, 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.

DIP Switches Settings

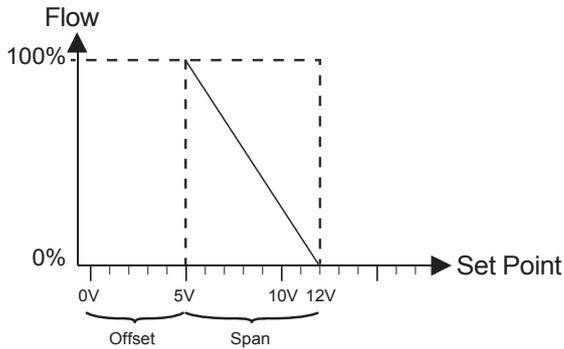
Command Signal	Feedback Signal	Setting User Interface	
0 to 10 VDC	Direct 0 to 10 VDC		
24 VAC Floating or ON/OFF			
0 to 10 VDC	Reverse 0 to 10 VDC		
24 VAC Floating or ON/OFF			
2 to 10 VDC	Direct 2 to 10 VDC		
24 VAC Floating or ON/OFF			
2 to 10 VDC	Reverse 2 to 10 VDC		
24 VAC Floating or ON/OFF			

Auto Calibration Mode

The actuator enters auto calibration mode and positions the coupler to the maximum and minimum end stops to identify the range of travel. To complete the auto calibration process, press **Enter/Autocal** until all three LEDs are on.

Setting the SPAN and OFFSET Proportional Command Signal to Other Values

The actuator has the possibility to adjust the input signal changing the working range and the starting point of the signal. The valid Offset values are 0 to 10 VDC and the valid Span values are 2 to 10 VDC. Adjusting span and offset the feedback voltage of the actuator is automatically set as 2-10 VDC.



Example

Command Signal	Feedback Signal	Setting User Interface
Offset = 5 Span = 7	Active 2 - 10 VDC	

1. Connect a digital multimeter between the orange (feedback) and black (common) wires. See Wiring for more wiring information.
2. Press **Enter/Autocal**.
Note: To adjust the span and offset, press but not hold **Enter/Autocal**.
Holding **Enter/Autocal** for longer than three seconds triggers an autocal.
The Offset Adj. LED turns on, and the multimeter displays the current offset value.
3. Press **INC**.
The Offset Adj. LED flashes. The voltage reading on the multimeter increases 0.5 VDC each time you press the button. Press **INC**. until you reach the desired voltage.
Once you press **INC**., if no further action is required, the Offset Adj. LED stops flashing after 10 seconds. The actuator exits the program mode and the original offset value remains unchanged.
4. Press **Enter/Autocal**.
The Offset Adj. LED turns off indicating that the desired Offset Adj. value was recorded. The Span Adj. turns on, and the multimeter displays the present SPAN value.
5. Press **INC**.
The Span Adj. LED flashes. The voltage reading on the multimeter increases by 0.5 VDC each time you press the button. Press **INC**. until you reach the desired voltage.
Once you press **INC**., if no further action is required, the Offset and Adj. LED stops flashing after 10 seconds. The actuator exits the program mode and the original offset value remains unchanged.
6. Press **Enter/Autocal**.
The Span Adj. LED turns off indicating that the desired Span Adj. setting is recored, and the actuator exits the program mode.

Reading the SPAN and OFFSET Proportional Command Signal Voltage Settings

1. Connect a digital multimeter between the orange (feedback) and black (common) wires. See Wiring for more wiring information.
2. Press **Enter/Autocal**.
The Offset Adj. LED turns on, and the multimeter displays the current offset value.

IMPORTANT: Do not press INC. Otherwise your observed offset voltage setting will change.

3. Press **Enter/Autocal**.
The Offset Adj. LED turns off, the Span Adj. LED turns on, and the multimeter displays the present SPAN value.

IMPORTANT: Do not press INC. Otherwise your observed SPAN voltage setting will change.

4. Press **Enter/Autocal**.
The Span Adj. LED turns off.

Clearing the SPAN and OFFSET Proportional Command Signal Voltage Setting

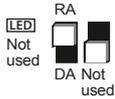
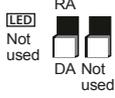
Cycle DIP switch two between 2 to 10 and 0 to 10. The active setting is the final state of DIP switch two.

Line voltage models and High Speed models (ON/OFF and Floating)

The **BAS2.10** provides 10 Nm rated torque and operates with AC 100 to 240 V (AC 85 to 264 V). The actuator has 35 seconds constant runtime and it's design to be used with ON/OFF or Floating controls in HVAC systems.

The **BAS1.08Z** (24 V DC/AC) and **BAS2.08Z** AC 100 to 240 V (AC 85 to 264 V) have 8 seconds constant runtime and provide 8 Nm rated torque. They are design to be used with ON/OFF or Floating controls in HVAC systems.

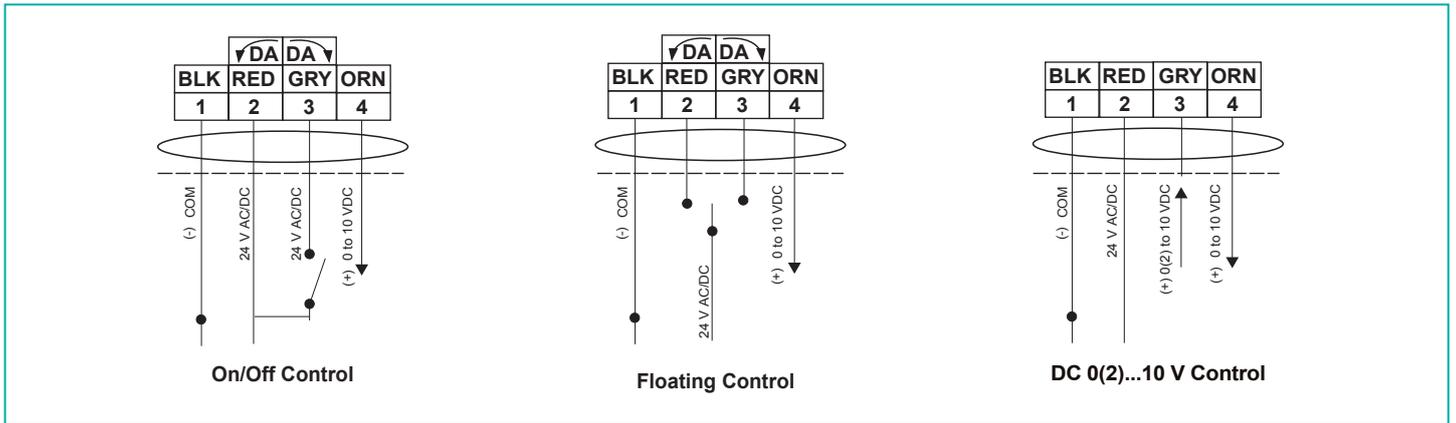
DIP Switch Settings

Command Signal	Setting User Interface
Reverse	 <p>LED Not used RA DA Not used</p>
Direct	 <p>LED Not used RA DA Not used</p>

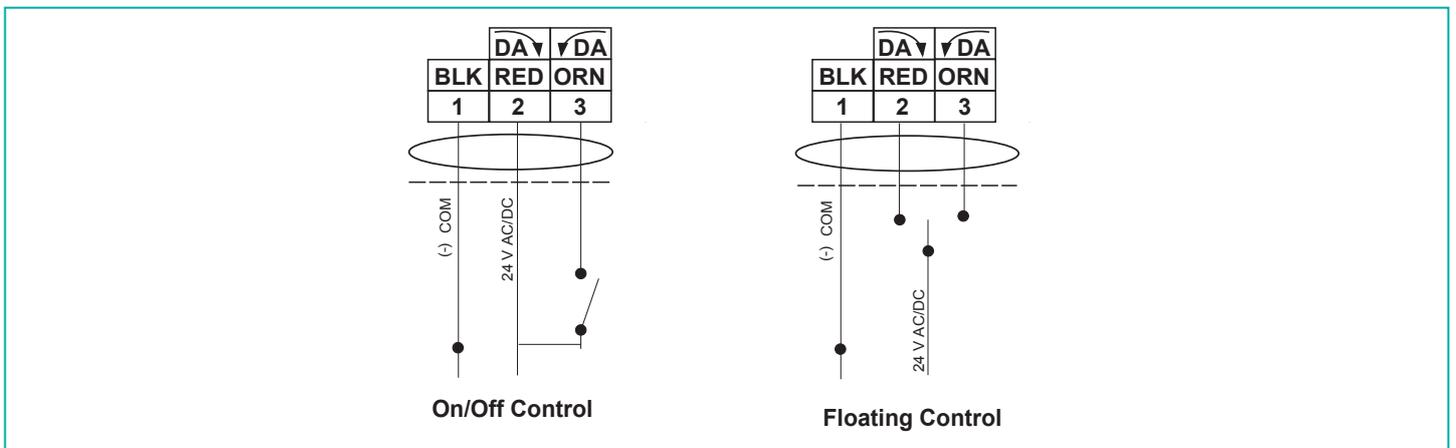
Ordering Informations

Code	Description
BAS1.08Z	8 Nm, ON/OFF and Floating control, 24 V AC/DC power supply, 8 seconds run time
BAS2.08Z	8 Nm, ON/OFF and Floating control, AC 100 to 240 V (AC 85 to 264 V) power supply, 8 seconds run time
BAS2.10	10 Nm, ON/OFF and Floating control, AC 100 to 240 V (AC 85 to 264 V) power supply, 35 seconds run time
BMS1.10	10 Nm, All-in-one ON/OFF, Floating and Proportional control, 24 V AC/DC power supply, 35 seconds run time

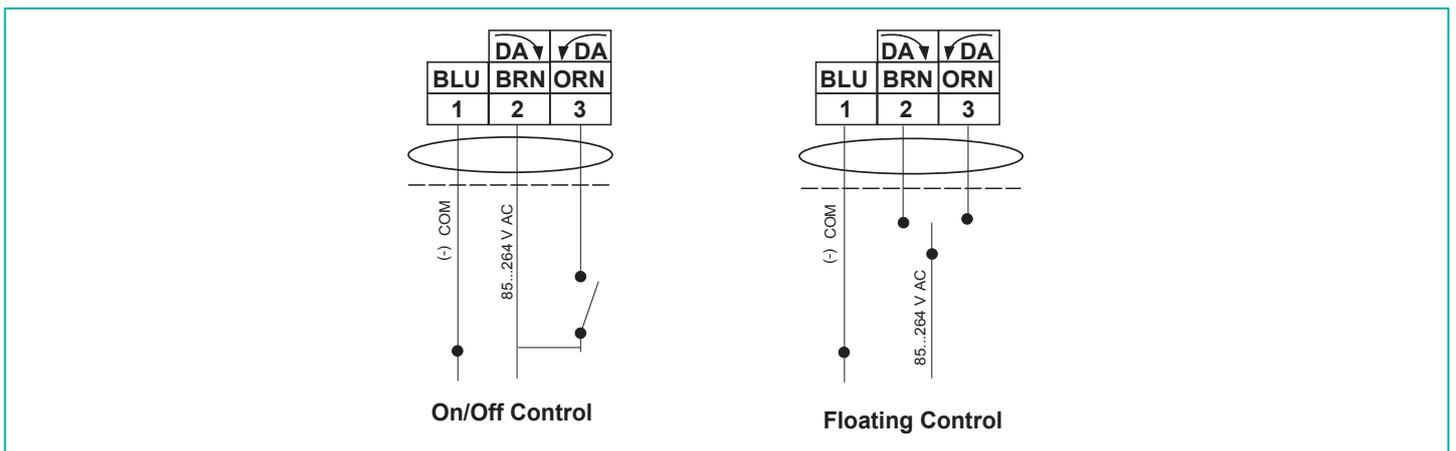
Wiring Diagrams



BMS1.10



BAS1.08Z



BAS2.08Z - BAS2.10

Technical Specifications

Product Code	BMS1.10	
Control Type	On/Off and Floating Mode	Proportional Mode
Power Requirements	24 VAC (AC 19.2 to 28.8 V) at 50/60 Hz, Class 2 (North America) or SELV (Europe), 6.2 VA running 24 VDC (DC 21.6 to 26.4 V), Class 2 (North America) or SELV (Europe), 1.9 W running	
Transformer Sizing Requirements	≥6.5 VA	
Input Signal/Adjustments	19.2 to 28.8 VAC at 50/60 Hz or 24 VDC ±10% Class 2 (North America) or SELV (Europe)	0 (2) to 10 VDC or 0 (4) to 20 mA with field furnished 500 Ohm 1/4 W resistor Offset: 0 to 10 VDC Span: 2 to 10 VDC
Control Impedance	4.7k ohm	100k ohm
Feedback Signal	0 (2) to 10 VDC	
Running Torque	10 Nm (90 lb·in)	
Rotation Range	Mechanically Limited 35° to 95° ±3° in 5° increments	
Rotation Time	35 seconds	
Rotation Time Autocalibration	35 seconds	
Cycles	100,000 Full Stroke Cycles; 2,500,000 Repositions	
Audible Noise	<40 dBA at 1 m (39-13/32 in.)	
Electrical Connections	1.2 m (48 in.) Halogen Free Cable with 18 AWG (0.82 mm ²) conductors and 6 mm (0.25 in.) ferrule ends	
Ambient Conditions	Operating: -30 to 60 °C (-22 to 140 °F), 95% RH, noncondensing (EN 60730-1) Storage: -40 to 85 °C (-40 to 185 °F), 95% RH, noncondensing	
Fluid Temperature Limits (Actuator and Valve Assembly)	JVx05 Series: -30 to 100 °C (-22 to 212 °F) JVx05Series with M9000-561 Thermal Barrier Installed: -30 to 140 °C (-22 to 284 °F) water; 103 kPa (15 psig) at 121 °C (250 °F) saturated steam	
Enclosure	IP54/NEMA 5	
Shipping Weight	0.9 kg (2 lb)	
Compliance	<p>United States: UL Listed, CCN XAPX, File E27734; to UL 60730-1: Automatic Electrical Controls for Household and Similar Use Part 1; and UL 60730-2-14: Part 2, Particular Requirements for Electric Actuators. Plenum Rated (UL 2043). Suitable for use in Other Environmental Air Space (Plenum) in accordance with section 300.22 (c) of the National Electrical Code.</p> <p>Canada: UL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1:02: Automatic Electrical Controls for Household and Similar Use Part 1; and CAN/CSA-E60730-2-14: Part 2, Particular Requirements for Electric Actuators.</p> <p>Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.</p> <p>Australia and New Zealand: RCM, Australia/NZ Emissions Compliant</p>	

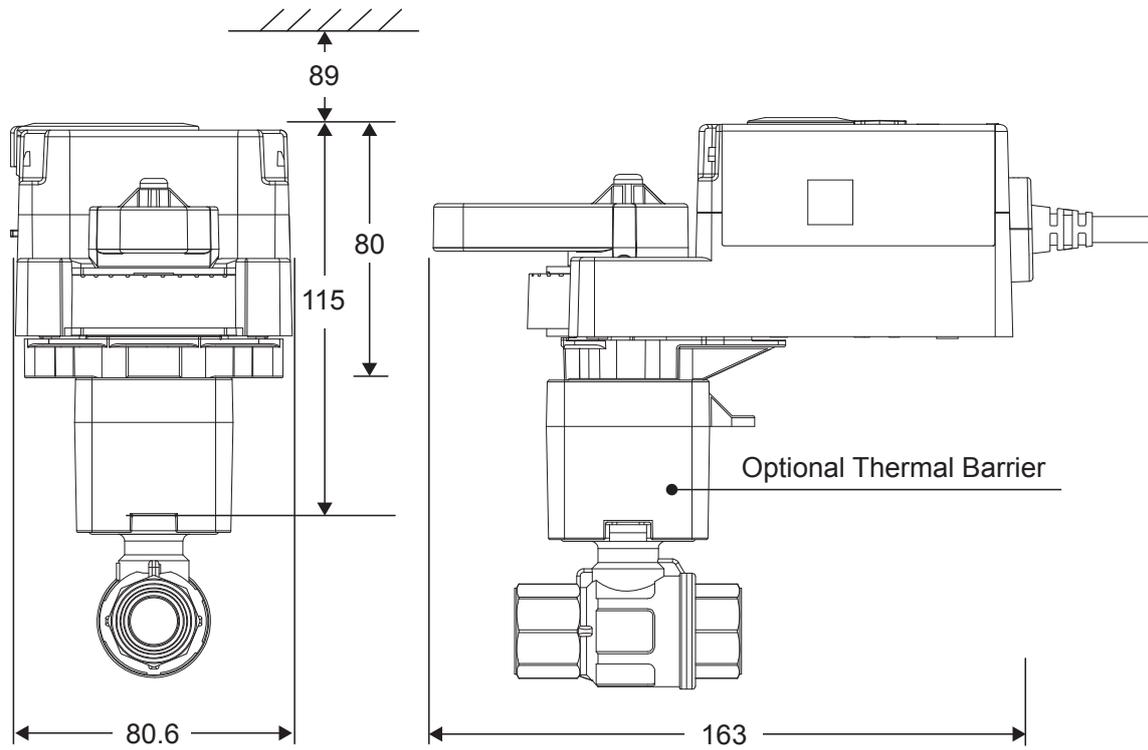


Technical Specifications

Product Code	BASx.08Z and BAS2.10		
Control Type	BAS1.08Z On/Off and Floating Mode	BAS2.08Z On/Off and Floating Mode	BAS2.10 On/Off and Floating Mode
Power Requirements	24 VAC ±20% at 50/60 Hz, Class 2 (North America) or SELV (Europe), 12.7 VA running 24 VDC ±10%, Class 2 (North America) or SELV (Europe), 5.7 W running	Nominal AC 230V at 50/60 Hz: 0.03 A Running, 0.01 A Holding Position	
Transformer Sizing Requirements	≥13 VA	---	
Input Signal/Adjustments	19.2 to 28.8 VAC at 50/60 Hz or 24 VDC ±10% Class 2 (North America) or SELV (Europe)	AC 100 to 240 V (AC 85 to 264 V) at 50/60 Hz	
Running Torque	8 Nm (70 lb·in)		10 Nm (90 lb·in)
Rotation Range	Mechanically Limited 35° to 95° ±3° in 5° increments		
Rotation Time for 90° of Travel	8 sec, constant for 0 to 8 Nm (70 lb·in) load, at all operating conditions		35 sec, constant for 0 to 10 Nm (90 lb·in) load, at all operating conditions
Cycles	60,000 Full Stroke Cycles; 1,500,000 Repositions		100,000 Full Stroke Cycles; 2,500,000 Repositions
Audible Noise	<52 dBA at 1 m		<35 dBA at 1 m
Electrical Connections	3.0 m (120 in) UL 444 type CMP plenum rated with 19 AWG (0.75 mm ²) conductors and 6 mm (0.25 in) ferrule ends	1.2 m (48 in) Halogen Free Cable with 18 AWG (0.82 mm ²) conductors and 6 mm (0.25 in.) ferrule ends	
Ambient Conditions	Operating: -30 to 60 °C (-22 to 140 °F), 95% RH, noncondensing (EN 60730-1) Storage: -40 to 85 °C (-40 to 185 °F), 95% RH, noncondensing		
Fluid Temperature Limits (Actuator and Valve Assembly)	JVx05 Series: -30 to 100 °C (-22 to 212 °F) JVx05 Series with M9000-561 Thermal Barrier Installed: -30 to 140 °C (-22 to 284 °F) water; 103 kPa (15 psig) at 121 °C (250 °F) saturated steam		
Enclosure	IP54/NEMA 5		
Shipping Weight	0.9 kg (2 lb)		
Compliance	United States: UL Listed, CCN XAPX, File E27734; to UL 60730-1: Automatic Electrical Controls for Household and Similar Use Part 1; and UL 60730-2-14: Part 2, Particular Requirements for Electric Actuators. Plenum Rated (UL 2043). Suitable for use in Other Environmental Air Space (Plenum) in accordance with section 300.22 (c) of the National Electrical Code. Canada: UL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1:02: Automatic Electrical Controls for Household and Similar Use Part 1; and CAN/CSA-E60730-2-14: Part 2, Particular Requirements for Electric Actuators. Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive. Australia and New Zealand: RCM, Australia/NZ Emissions Compliant		



Dimensions



Accessories

The Non Spring Return Actuators for Ball Valves line has several kit and accessories that can be ordered separately and mounted on site.

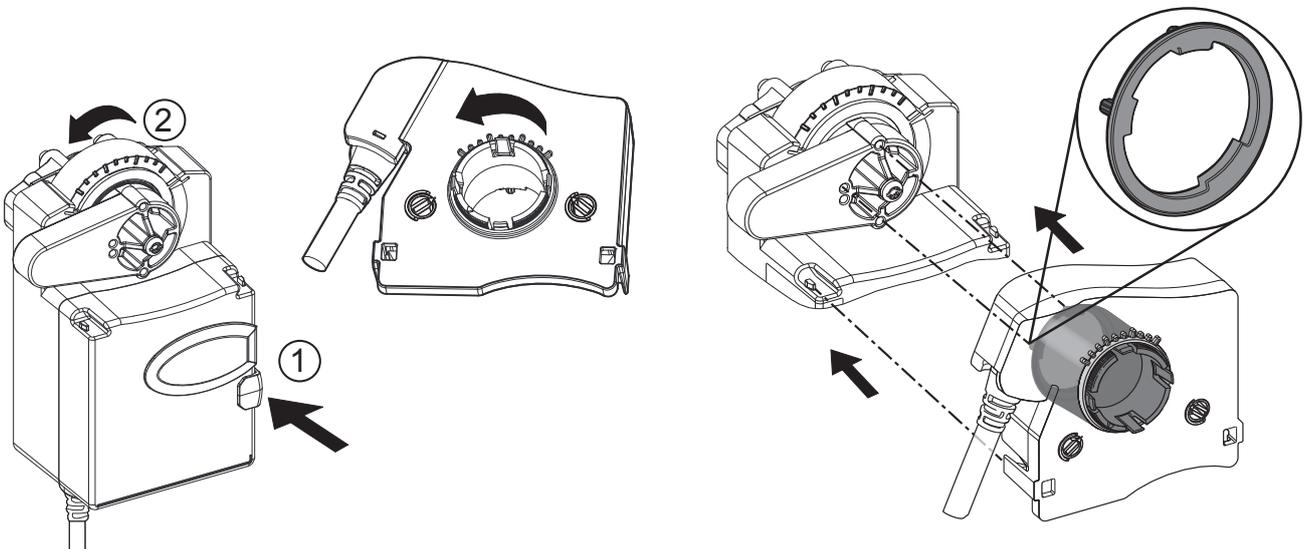
Code Number	Description
M9000-342	NEMA 4X, IP66/67 Weathershield Kit for JVx05 Series Ball application of BxD, BMS1.10, BxF.03 and BxF.08 Series Electric Actuators (quantity 1)
M9000-400	Jackshaft Linkage Adapter Kit (quantity 1)
M9000-561	Thermal Barrier Kit. Extends the BxD, BMS1.10, BxF.03 and BxF.08 Series Electric Non-Spring Return Actuators applications to include low pressure steam (quantity 1).
M9000-606	Position indicator for Auxiliary Switches and Feedback Potentiometer Kits (quantity 5)
JOV-SW1	Auxiliary Switch Kit (one single-pole, double-throw)
JOV-SW2	Auxiliary Switch Kit (two single-pole, double-throw)
M9300-100	Threaded Conduit Adapters for 12.7 mm (1/2 in.) electrician's fittings (quantity 5)
M9300-140	External Auxiliary Feedback Potentiometer 140k Ohm
M9300-1K	External Auxiliary Feedback Potentiometer 1k Ohm
M9300-2K	External Auxiliary Feedback Potentiometer 2k Ohm
M9300-10K	External Auxiliary Feedback Potentiometer 10k Ohm
M9310-500	Ball Valve Linkage Kit for applying DM1.10 Series Electric Actuators to JVx05 Series Valves (quantity 1)

Auxiliary Switch & Potentiometer Feedback Kit

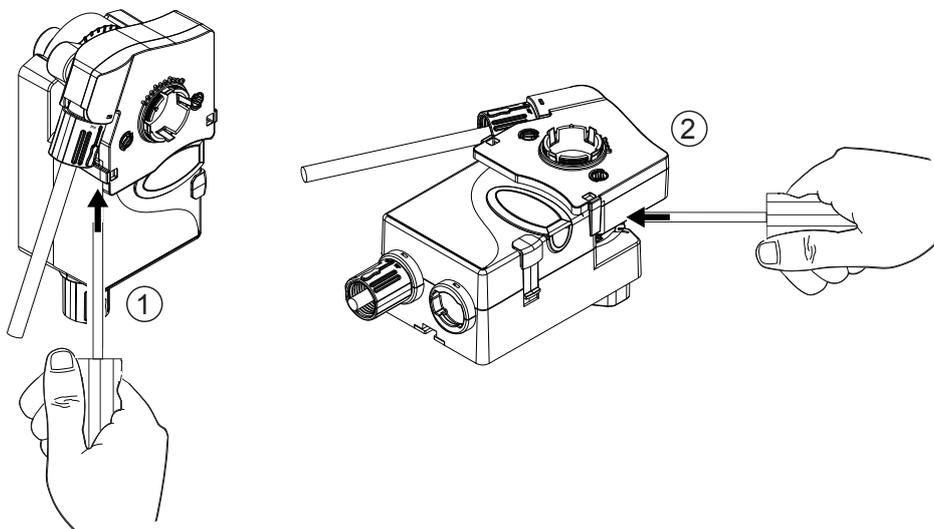
Mounting the kit, a connection is created between the shaft hub of the actuator and the kit.
The position of the actuator is transferred to the gear's kit.



1. Before mounting the kit, rotate the actuator and the kit itself counter clock wise till the end position in order to align the holes on the coupler with the pins on the kit and snap the kit onto the BMS1.10 actuators.

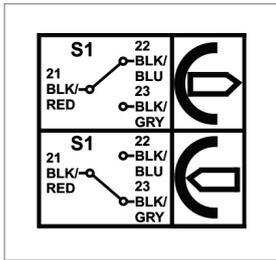


2. To remove the kit Place a screwdriver underneath the tab on each side of the actuator and firmly pull back the tab.

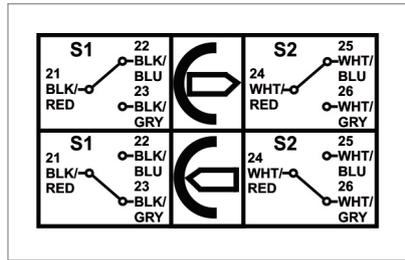


Auxiliary switches kits

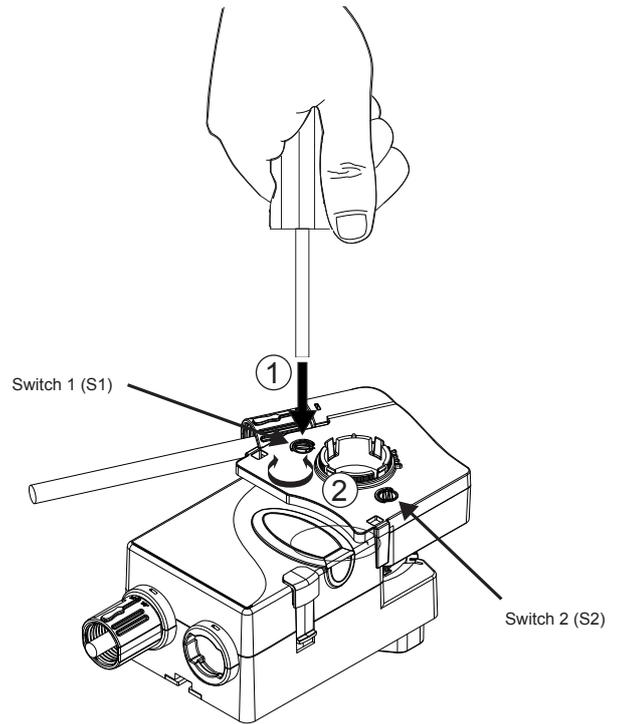
The auxiliary switches kits are used to notify starting and end position or to perform switching functions in any angular position. The switching points can be adjust by means of a dial.



JOV-SW1



JOV-SW2



Feedback potentiometer kits

The feedback potentiometers are used as damper position indicators or as positioners for actuators operated in parallel.

Resistor Value	
M9300-140	140 Ω
M9300-1K	1K Ω
M9300-2K	2K Ω
M9300-10K	10K Ω