

BAS / BMS

Non Spring Return Actuators for Ball Valves

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 from 8 to 35 Nm rated torque.



- **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

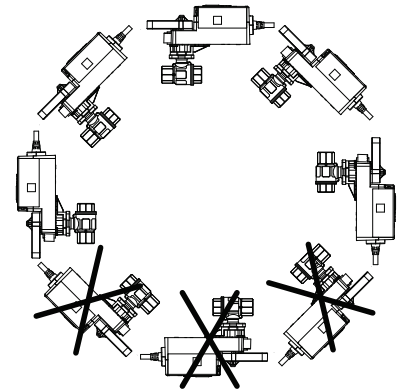
Install the ball valve with the actuator at or above the center line of the horizontal piping.



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.

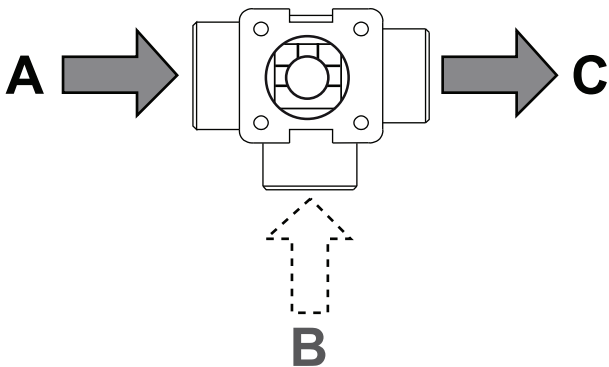
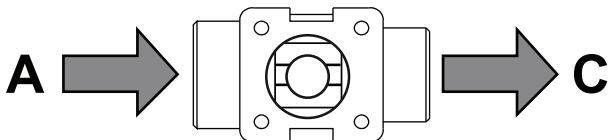


WARNING: Do not install or use this actuator in or near environments where corrosive substances or vapors could be present. Exposure of the actuator to corrosive environments may damage the device's internal components, and will void the warranty.

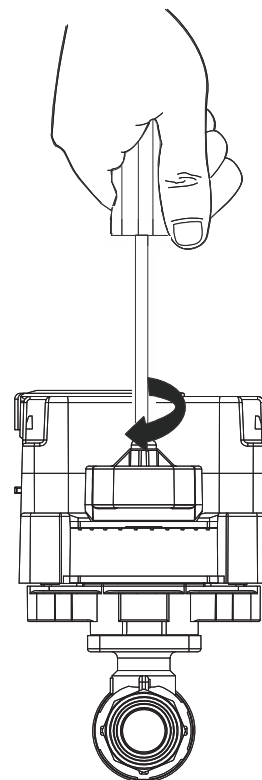
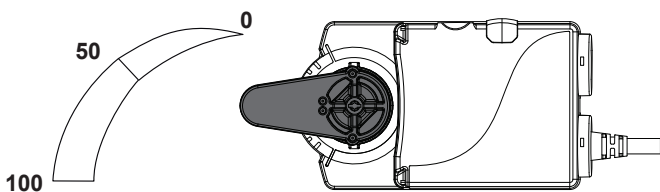


Mounting the actuator Inline to the Valve

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

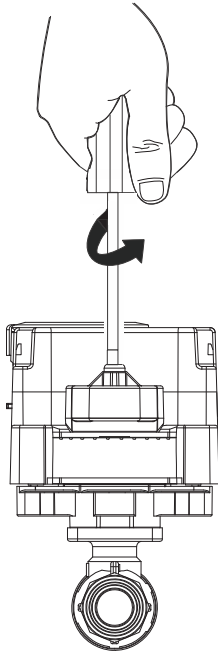


2. Verify that the actuator handle is inline to the actuator.

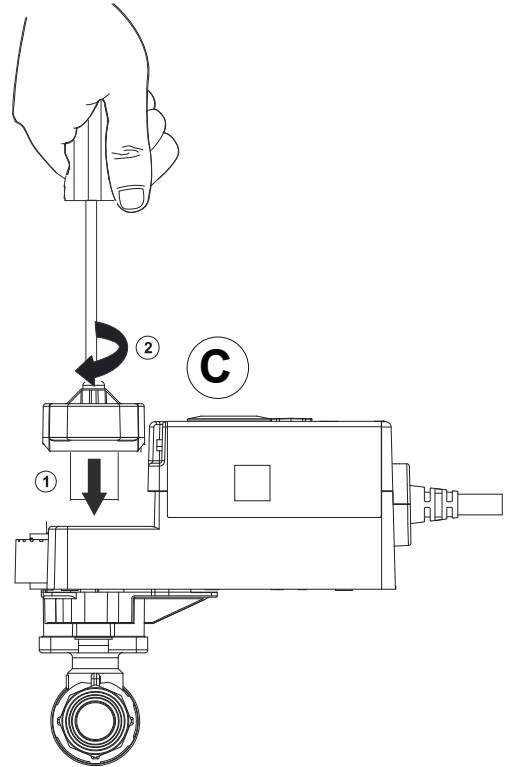


Mounting the Actuator Perpendicular to the Valve

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.

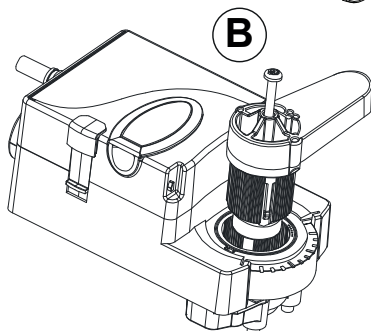
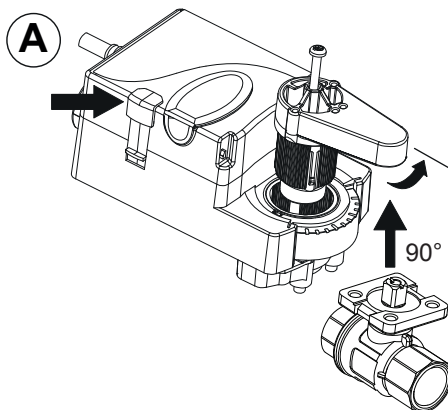


2. Remove the actuator from the valve.

3. Press and hold the gear release.

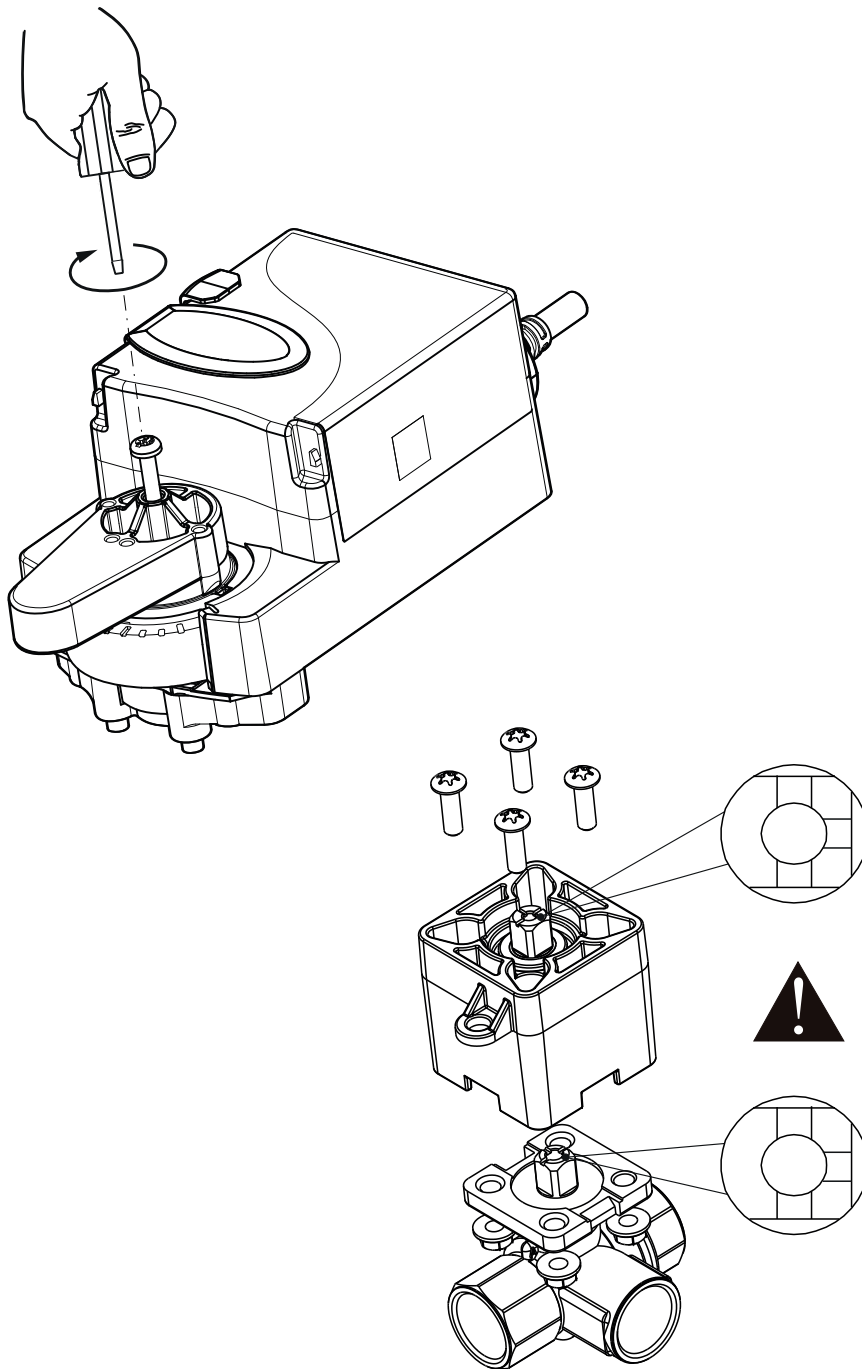
The actuator should be against the internal CCW stop.

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



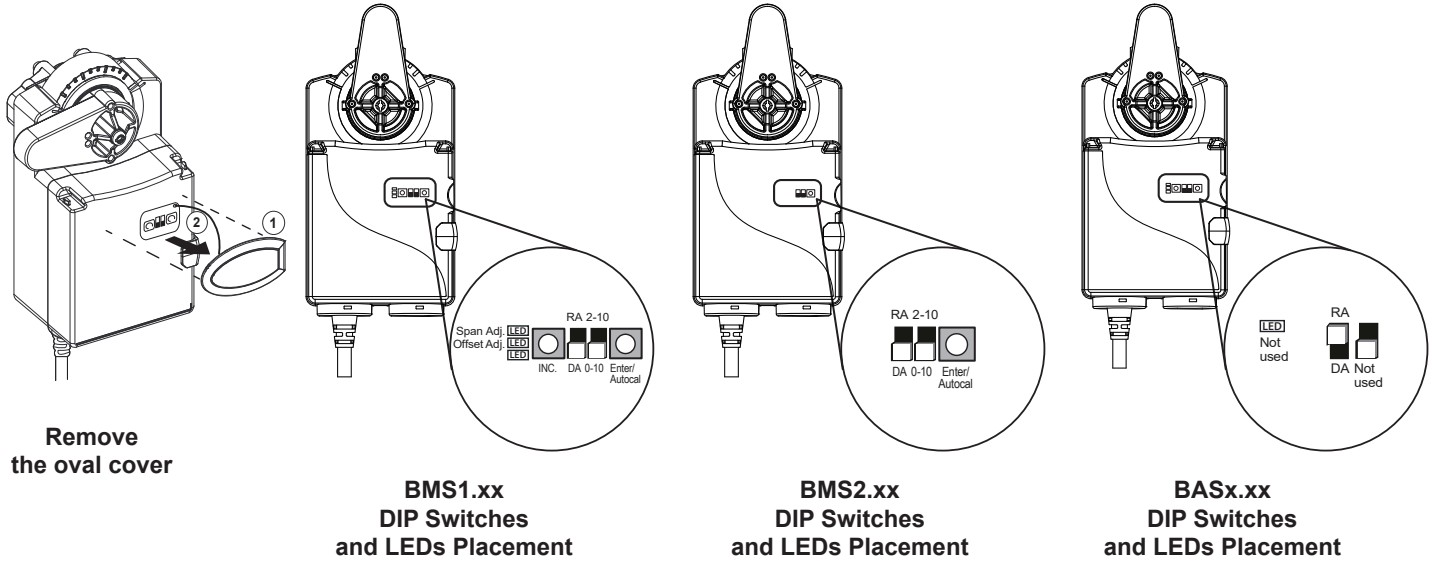
M9000-561 Thermal Barrier

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 *installation sheet* for further information, *DIP switches and LEDs meaning*.



Automatic Signal Input Detection model

BMS1.10, BMS1.20 and BMS1.35-1 Actuator operate with 24 VAC/DC to provide 10, 20 and 35 Nm rated torque. The actuators can be used with on/off, floating, or proportional controllers in HVAC systems that are controlled by an electronic controller or positioner.

When the Actuators work 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

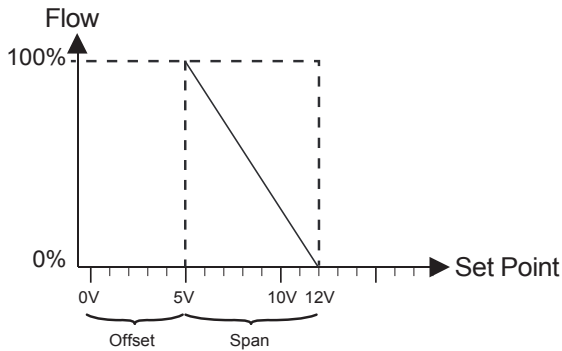
| Command Signal | Feedback Signal | Setting User Interface | |
|------------------------------|------------------------|------------------------|--|
| 0 to 10 VDC | Direct 0 to 10 VDC | | |
| 24 VAC Floating or ON/OFF | | | |
| 0 to 10 VDC | Reverse 0 to 10 VDC | | |
| 24 VAC Floating or ON/OFF | |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

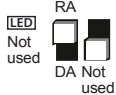
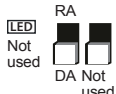
Cycle DIP switch two between 2 to 10 and 0 to 10. The active setting is the final state of DIP switch two.

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

The **BAS2.xx** operates with AC 100 to 240 V (AC 85 to 264 V). The actuator is design to be used with ON/OFF or Floating controls in HVAC systems.

The **BAS1.08Z** and **BAS1.16Z** operate with 24 V DC/AC.

DIP Switch Settings

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

Ordering Informations

| Code | Torque (Nm) | Running Time (s) | Controls Signal | Supply Voltage |
|------------------|-------------|------------------|-----------------------------------|----------------|
| BAS1.08Z | 8 | 8 | ON/OFF and Floating | 24V AC/DC |
| BAS2.08Z | 8 | 8 | ON/OFF and Floating | 100 to 240 VAC |
| BAS2.10 | 10 | 35 | ON/OFF and Floating | 100 to 240 VAC |
| BMS2.10 | 10 | 35 | Proportional | 100 to 240 VAC |
| BMS1.10 | 10 | 35 | ON/OFF, Floating and Proportional | 24V AC/DC |
| BAS1.16Z* | 16 | 16 | ON/OFF and Floating | 24V AC/DC |
| BAS2.16Z* | 16 | 16 | ON/OFF and Floating | 100 to 240 VAC |
| BAS2.20 | 20 | 90 | ON/OFF and Floating | 100 to 240 VAC |
| BMS2.20 | 20 | 90 | Proportional | 100 to 240 VAC |
| BMS1.20 | 20 | 90 | ON/OFF, Floating and Proportional | 24V AC/DC |
| BAS2.35 | 35 | 150 | ON/OFF and Floating | 100 to 240 VAC |
| BMS2.35 | 35 | 150 | Proportional | 100 to 240 VAC |
| BMS1.35 | 35 | 150 | ON/OFF, Floating and Proportional | 24V AC/DC |

*: Excluded from use along with JVx05 Ball Valve Series

Technical Specifications

BASx.08Z

| Product Code | BAS1.08Z | BAS2.08Z |
|------------------------|---|--|
| Control Type | On/Off, Floating | |
| Power | AC 24 V \pm 20%, 50/60 Hz: 12.7 VA DC 24 V \pm 10%: 6.5 W | Nominal AC 230 V, 50/60 Hz: 0.08 A |
| Transformer | \geq 13 VA | --- |
| Input | 24 VAC \pm 20%, 24 VDC \pm 10% | 100...240 VAC (AC 85...264 V) at 50/60 Hz |
| Impedance | 100k ohm | 315k ohm |
| Feedback | --- | |
| Torque | 8 Nm | |
| Rotation Range | 90° | |
| Rotation Time | 8s | |
| Cycles | 60,000 full stroke cycles; 1,500,000 repositions | |
| Audible Noise | <52 dBA at 0 to 8 Nm load, at a distance of 1 m | |
| Electrical Connections | 120 in. (3.05 m) UL 444 type CMP plenum rated cable with 19 AWG (0.75 mm ²) conductors and 0.25 in. (6 mm) ferrule ends | 1.2 m (48 in.) Halogen Free Cable with 0.82 mm ² (18 AWG) conductors and 6 mm (0.25 in.) ferrule ends |
| Ambient Conditions | Operating: -30 to 60°C, 95% RH, noncondensing Storage: -40 to 85°C, 95% RH, noncondensing | |
| Enclosure | IP54 | |
| Shipping Weight | 0.9 kg | |

BxSx.10

| Product Code | BAS2.10 | BMS2.10 | BMS1.10 | |
|------------------------|--|---|--|---|
| Control Type | On/Off, Floating | Proportional | On/Off, Floating | Proportional |
| Power | Nominal AC 230 V, 50/60 Hz: 0.03 A | Nominal AC 230 V, 50/60 Hz: 0.05 A | 24 V \pm 20%, 50/60 Hz: 6.2 VA 24 VDC \pm 10%, 1.9 W | |
| Transformer | --- | | \geq 6.5 VA | |
| Input | 100...240 VAC (AC 85...264 V) at 50/60 Hz | 0(2)...10 VDC, 0(4)...20 mA with field furnished 500 ohm resistor, Offset: 0...10 VDC, Span: 2...10 VDC | 24 VAC \pm 20%, 24 VDC \pm 10% | 0(2)...10 VDC, 0(4)...20 mA with field furnished 500 ohm resistor, Offset: 0...10 VDC, Span: 2...10 VDC |
| Impedance | 315k ohm | Voltage control: 100 k Ω Current control: 0.5 k Ω | 100k ohm | Voltage Control: 100 k Ω Current Control: 0.5 k Ω |
| Feedback | --- | | --- | 0(2)...10 VDC |
| Torque | 10 Nm | | | |
| Rotation Range | 90° | | | |
| Rotation Time | 35s | | | |
| Cycles | 100,000 full stroke cycles; 2,500,000 repositions | | | |
| Audible Noise | <35 dBA at 0 to 10 Nm load, at a distance of 1 m | | | |
| Electrical Connections | 1.2 m (48 in.) Halogen Free Cable with 0.82 mm ² (18 AWG) conductors and 6 mm (0.25 in.) ferrule ends | | | |
| Ambient Conditions | Operating: -30 to 60°C, 95% RH, noncondensing Storage: -40 to 85°C, 95% RH, noncondensing | | | |
| Enclosure | IP54 | | | |
| Shipping Weight | 0.9 kg | | | |

Technical Specifications

BASx.16Z

| Product Code | BAS1.16Z | BAS2.16Z |
|------------------------|---|--|
| Control Type | On/Off, Floating | |
| Power | AC 24 V \pm 20%, 50/60 Hz: 11.6 VA DC 24 V \pm 10%: 5.4 W | Nominal AC 230 V, 50/60 Hz: 0.07 A |
| Transformer | \geq 13 VA | -- |
| Input | 24 VAC \pm 20%, 24 VDC \pm 10% | 100...240 VAC (AC 85...264 V) at 50/60 Hz |
| Impedance | 100k ohm | 315k ohm |
| Feedback | -- | |
| Torque | 16 Nm | |
| Rotation Range | 90° | |
| Rotation Time | 16s | |
| Cycles | 60,000 full stroke cycles; 1,500,000 repositions | |
| Audible Noise | <52 dBA at 0 to 16 Nm load, at a distance of 1 m | |
| Electrical Connections | 120 in. (3.05 m) UL 444 type CMP plenum rated cable with 19 AWG (0.75 mm ²) conductors and 0.25 in. (6 mm) ferrule ends | 1.2 m (48 in.) Halogen Free Cable with 0.82 mm ² (18 AWG) conductors and 6 mm (0.25 in.) ferrule ends |
| Ambient Conditions | Operating: -30 to 60°C, 95% RH, noncondensing Storage: -40 to 85°C, 95% RH, noncondensing | |
| Enclosure | IP54 | |
| Shipping Weight | 0.9 kg | |

BxSx.20

| Product Code | BAS2.20 | BMS2.20 | BMS1.20 | |
|------------------------|--|---|--|---|
| Control Type | On/Off, Floating | Proportional | On/Off, Floating | Proportional |
| Power | Nominal AC 230 V, 50/60 Hz: 0.04 A | Nominal AC 230 V, 50/60 Hz: 0.04 A | 24 V \pm 20%, 50/60 Hz: 6.2 VA 24 VDC \pm 10%, 1.9 W | |
| Transformer | --- | | \geq 6.5 VA | |
| Input | 100...240 VAC (AC 85...264 V) at 50/60 Hz | 0(2)...10 VDC, 0(4)...20 mA with field furnished 500 ohm resistor, Offset: 0...10 VDC, Span: 2...10 VDC | 24 VAC \pm 20%, 24 VDC \pm 10% | 0(2)...10 VDC, 0(4)...20 mA with field furnished 500 ohm resistor, Offset: 0...10 VDC, Span: 2...10 VDC |
| Impedance | 315k ohm | Voltage Control: 100 k Ω Current Control: 0.5 k Ω | 100k ohm | Voltage Control: 100 k Ω Current Control: 0.5 k Ω |
| Feedback | -- | 0(2)...10 VDC | -- | 0(2)...10 VDC |
| Torque | 20 Nm | | | |
| Rotation Range | 90° | | | |
| Rotation Time | 90s | | | |
| Cycles | 100,000 full stroke cycles; 2,500,000 repositions | | | |
| Audible Noise | <45 dBA at 0 to 20 Nm load, at a distance of 1 m | | | |
| Electrical Connections | 1.2 m (48 in.) Halogen Free Cable with 0.82 mm ² (18 AWG) conductors and 6 mm (0.25 in.) ferrule ends | | | |
| Ambient Conditions | Operating: -30 to 60°C, 95% RH, noncondensing Storage: -40 to 85°C, 95% RH, noncondensing | | | |
| Enclosure | IP54 | | | |
| Shipping Weight | 0.9 kg | | | |

Technical Specifications

BxSx.35

| Product Code | BAS2.35 | BMS2.35 | BMS1.35 | |
|------------------------|--|---|--|---|
| Control Type | On/Off, Floating | Proportional | On/Off, Floating | Proportional |
| Power | Nominal AC 230 V, 50/60 Hz: 0.04 A | Nominal AC 230 V, 50/60 Hz: 0.04 A | 24 V \pm 20%, 50/60 Hz. 6.2 VA 24 VDC \pm 10%, 1.9 W | |
| Transformer | --- | | \geq 6.5 VA | |
| Input | 100...240 VAC (AC 85...264 V) at 50/60 Hz | 0(2)...10 VDC, 0(4)...20 mA with field furnished 500 ohm resistor, Offset: 0...10 VDC, Span: 2...10 VDC | 24 VAC \pm 20%, 24 VDC \pm 10% | 0(2)...10 VDC, 0(4)...20 mA with field furnished 500 ohm resistor, Offset: 0...10 VDC, Span: 2...10 VDC |
| Impedance | 315k ohm | Voltage Control: 100 k Ω Current Control: 0.5 k Ω | 100k ohm | Voltage Control: 100 k Ω Current Control: 0.5 k Ω |
| Feedback | -- | 0(2)...10 VDC | -- | 0(2)...10 VDC |
| Torque | 35 Nm | | | |
| Rotation Range | 90° | | | |
| Rotation Time | 150s | | | |
| Cycles | 30,000 full stroke cycles; 750,000 repositions | | | |
| Audible Noise | <45 dBA at 0 to 35 Nm load, at a distance of 1 m | | | |
| Electrical Connections | 1.2 m (48 in.) Halogen Free Cable with 0.82 mm ² (18 AWG) conductors and 6 mm (0.25 in.) ferrule ends | | | |
| Ambient Conditions | Operating: -30 to 60°C, 95% RH, noncondensing Storage: -40 to 85°C, 95% RH, noncondensing | | | |
| Enclosure | IP54 | | | |
| Shipping Weight | 0.9 kg | | | |

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, Particular Requirements for Electric Actuators.



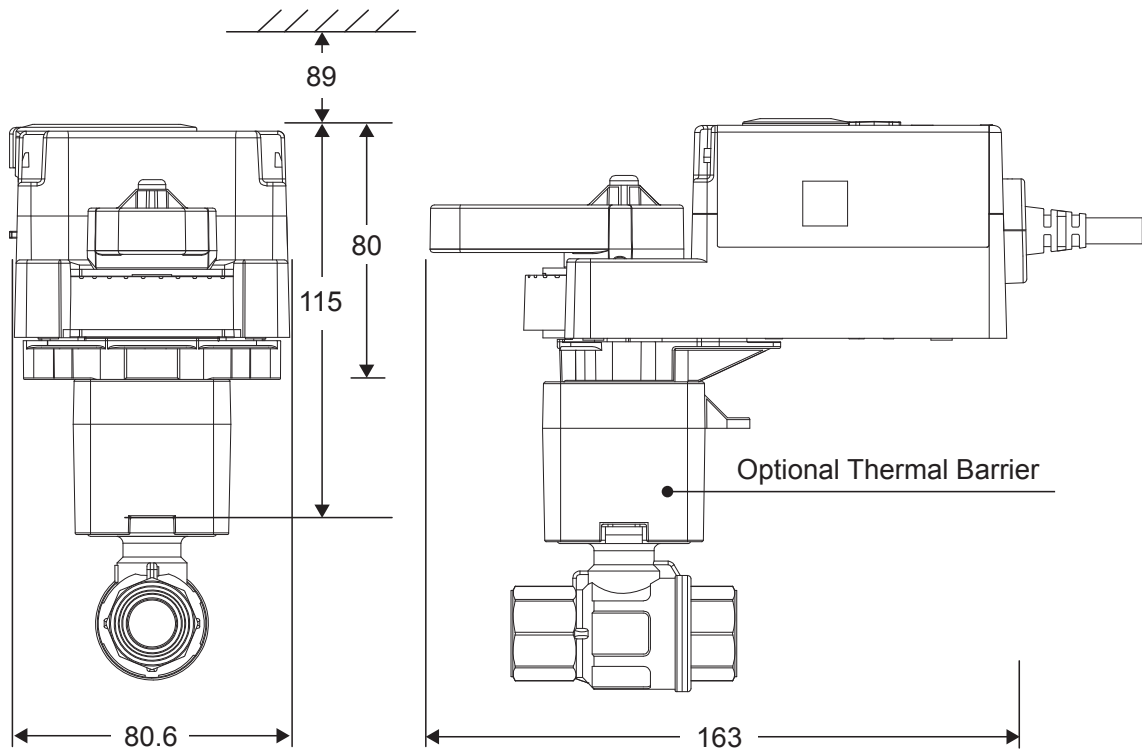
Europe:

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.

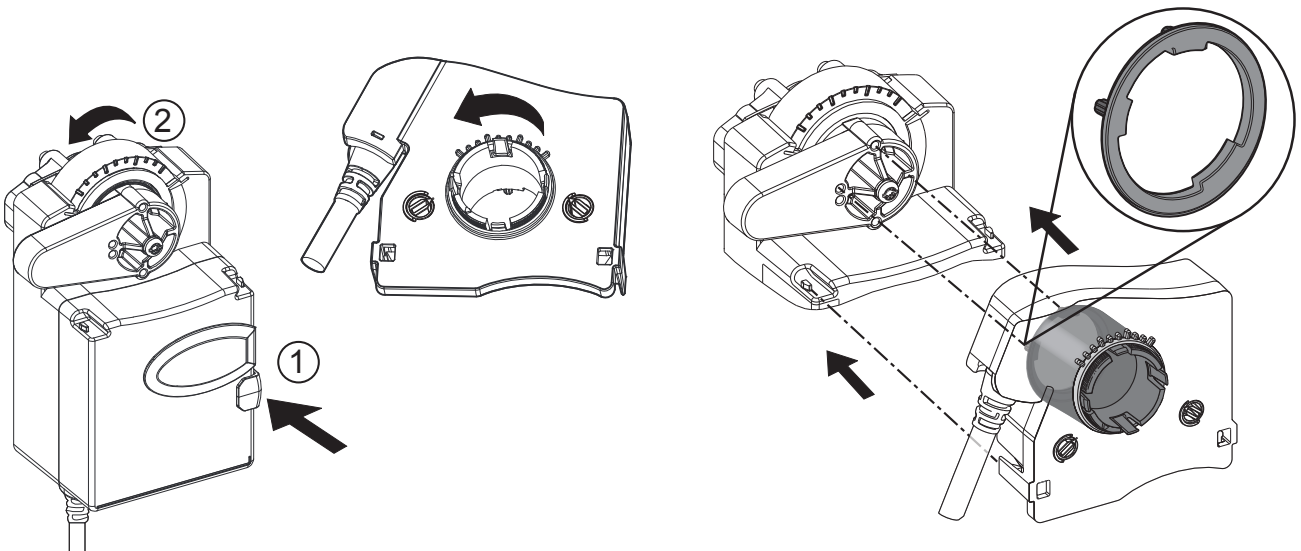
| Code Number | Description |
|------------------|---|
| M9000-342 | NEMA 4X, IP66/67 Weathershield Kit for JVx05 Series Ball application of BxD, BMS1.10, BxF.03 and BxF.08 Series Electric Actuators (quantity 1) |
| M9000-400 | Jackshaft Linkage Adapter Kit (quantity 1) |
| M9000-561 | Thermal Barrier 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 140 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) |
| M9000-700 | Universal ball valve linkage kit for mounting BASx.08Z and BxSx.10 actuators to other manufacturers ball valves |

Auxiliary Switch & Potentiometer Feedback Kit

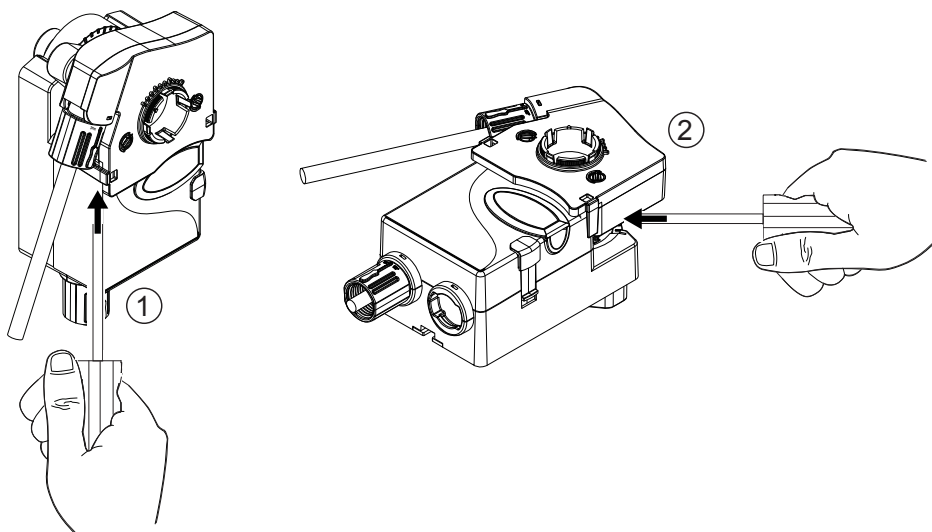
Mounting the kit, a connection is created between the shaft hub of the actuator and the kit.
The position of the actuator is transferred to the gear's kit.



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.

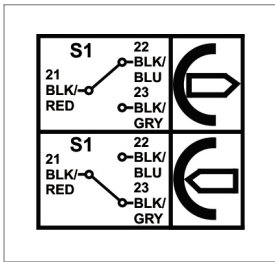


2. To remove the kit Place a screwdriver underneath the tab on each side of the actuator and firmly pull back the tab.

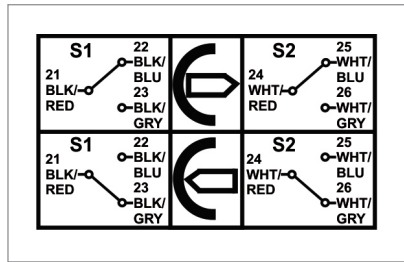


Auxiliary switches kits

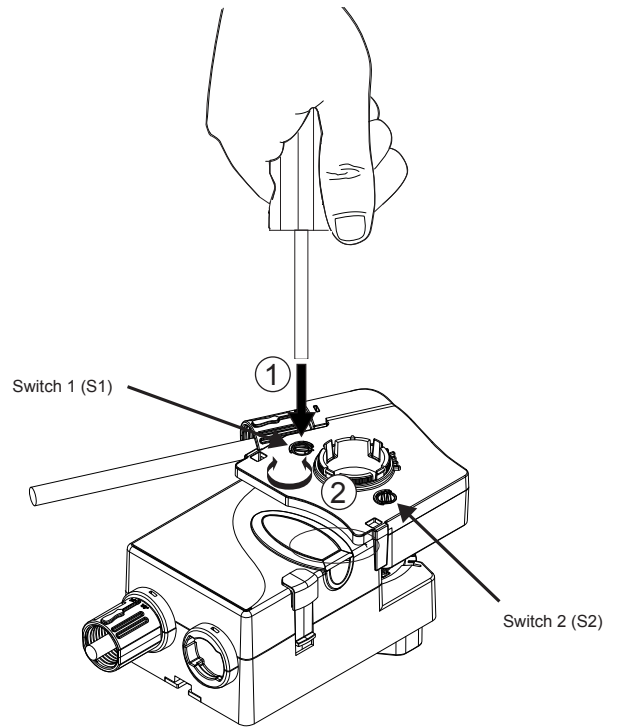
The auxiliary switches kits are used to notify starting and end position or to perform switching functions in any angular position. The switching points can be adjust by means of a dial.



JOV-SW1

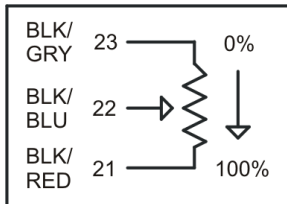


JOV-SW2



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 |