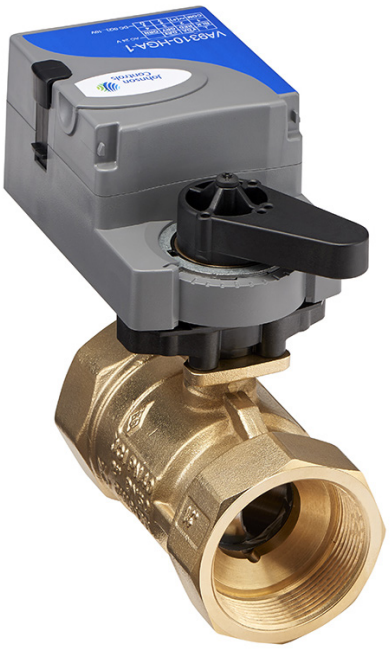
VA9310
Non Spring Return Actuators

Product Bulletin

The VA9310 Series Electric Spring Return Actuators are used to provide accurate positioning on Johnson Controls® VG1000 Series DN15 up to DN50 ball valves in Heating, Ventilating and Air Conditioning (HVAC) applications.



- **Universal model On/Off, floating and Proportional**
  Increase availability at distributors. Simplify retrofit.
- **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 the VA9310 Series Actuators are ready for direct attachment to Johnson Controls VG1000 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.

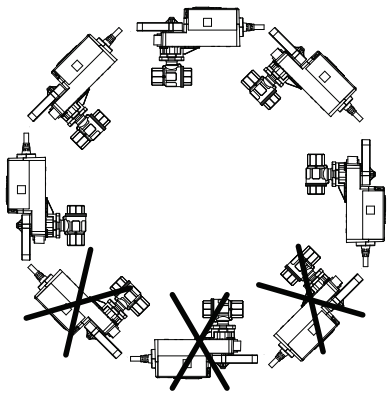
Johnson Controls

Installation

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

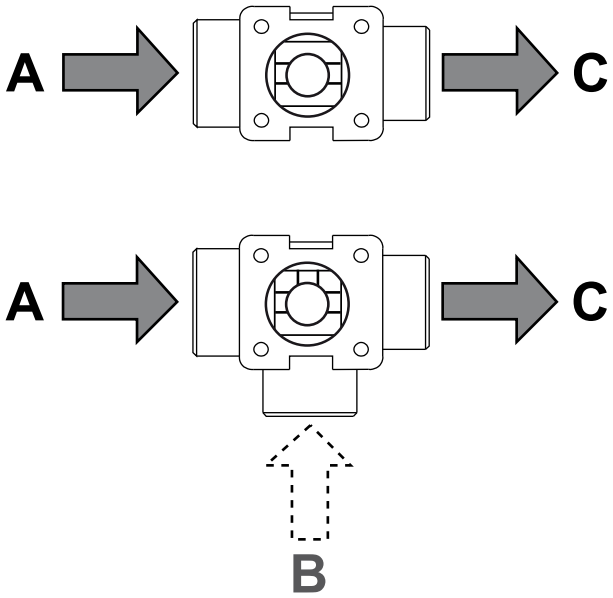
WARNING: In steam applications, install the valve with the stem horizontal to the piping.
Failure to follow this precaution may shorten the life of the actuator.

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.

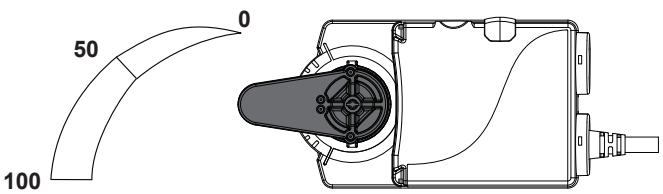


Mounting the actuator Inline to the Valve

1. Make sure the valve stem is inline to the valve Openings.

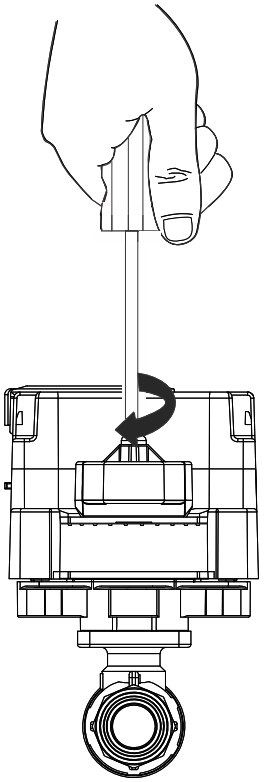


2. Verify that the actuator handle is inline to the actuator.



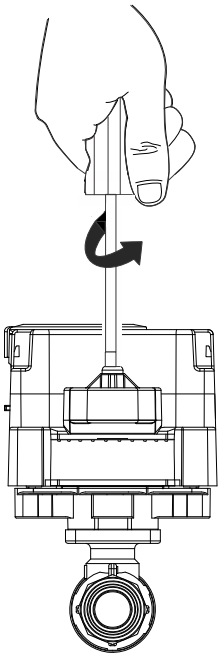
3. Place the actuator inline into the valve.

4. Tighten the actuator handle to the valve.



Mounting the Actuator Perpendicular to the Valve

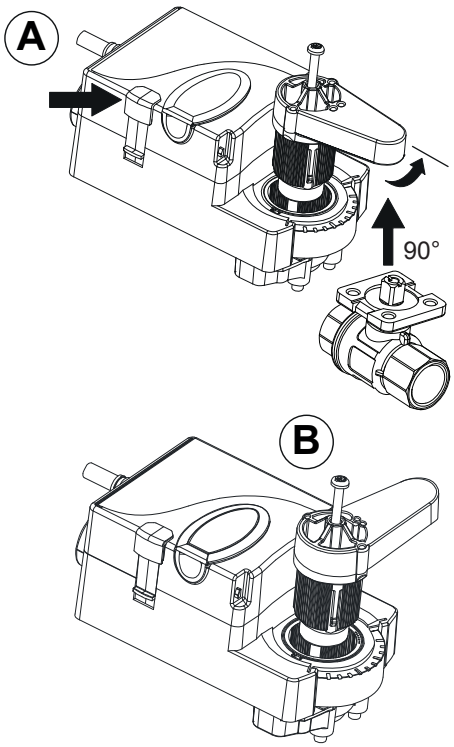
1. Loosen but do not remove the screw that holds the actuator to the valve.



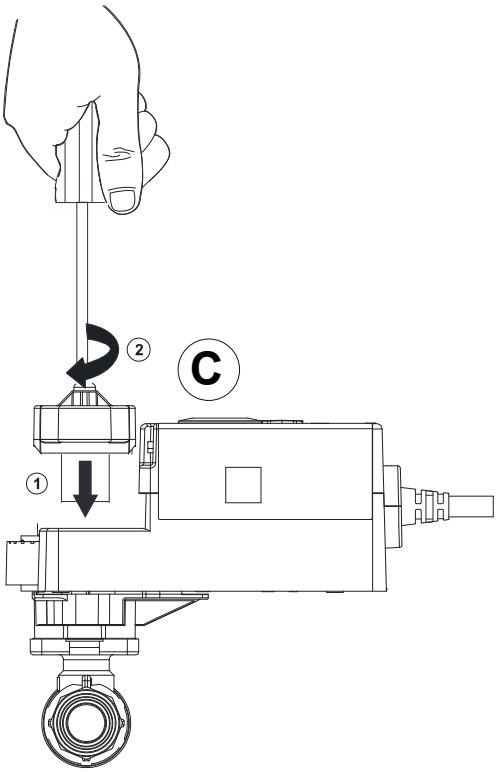
2. Remove the actuator from the valve.

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.

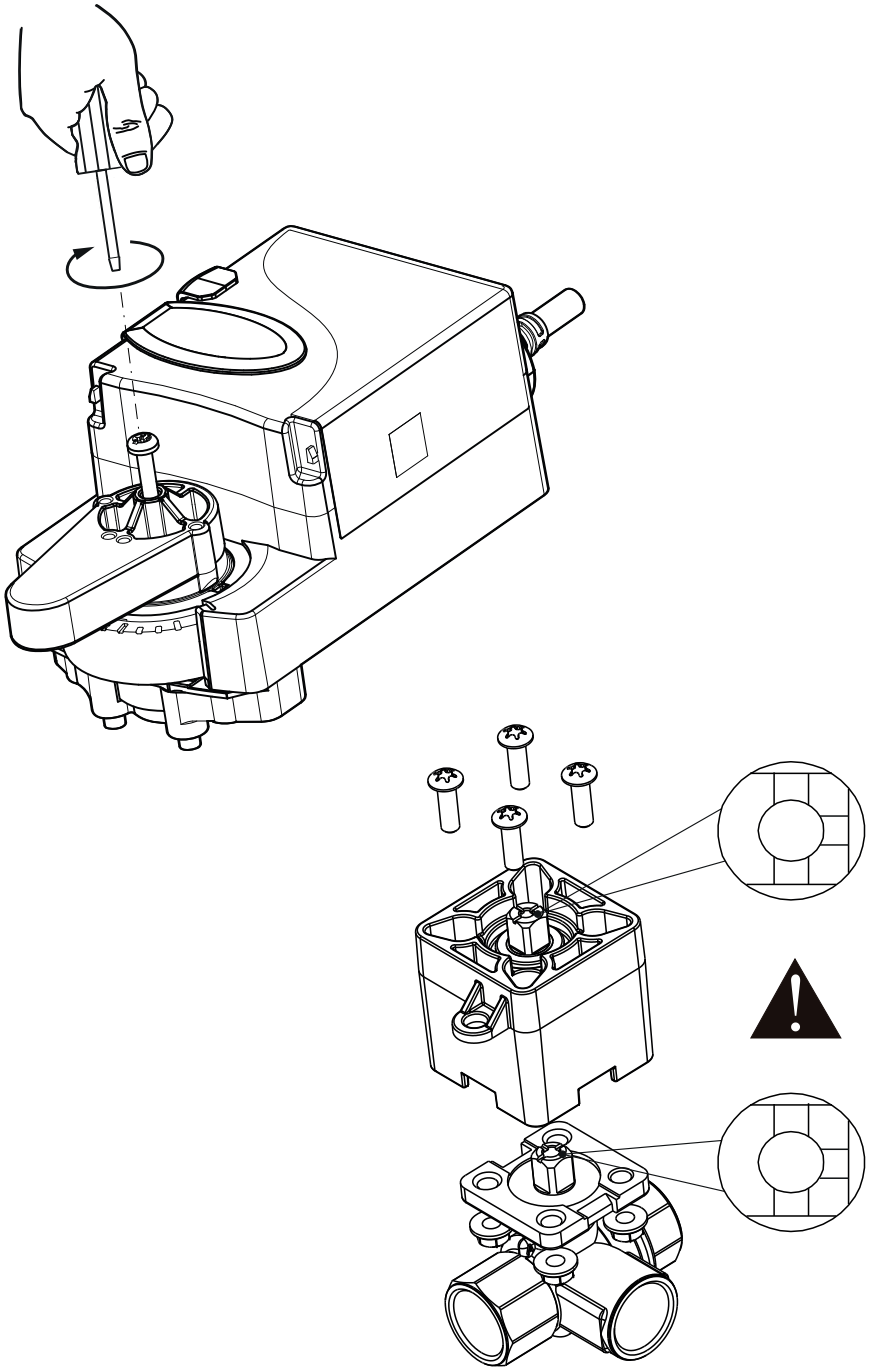


5. Reinsert the handle perpendicular into the actuator and tighten the handle screw.



M9000-561 Thermal Barrier

The Thermal barrier optional kit extends the application of the VA9310 actuators in combination with VG1000 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).



Universal model

VA9310-HGA-1 Actuator operates with 24 VAC/DC to provide 10 Nm rated torque. The actuator can be used with on/off, floating, or proportional controllers.

The actuators have 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 VA9310-HGx Series Actuators are 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.

Ordering Informations

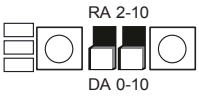
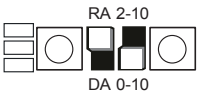
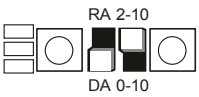
Code	Description
VA9310-HGA-1	All-in-one on/off, floating, and proportional control with 24 VAC/DC power supply

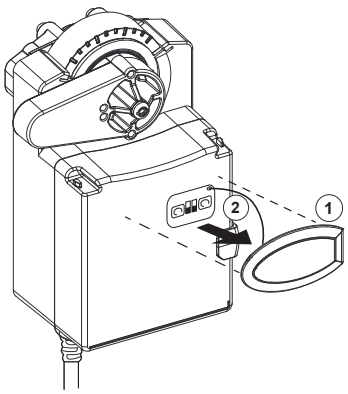
Accessing the DIP Switches and LEDs

Locate the oval cover on the front of the unit and pull the cover outward.*See figure and table below for viewing the DIP switches and LEDs meaning.*

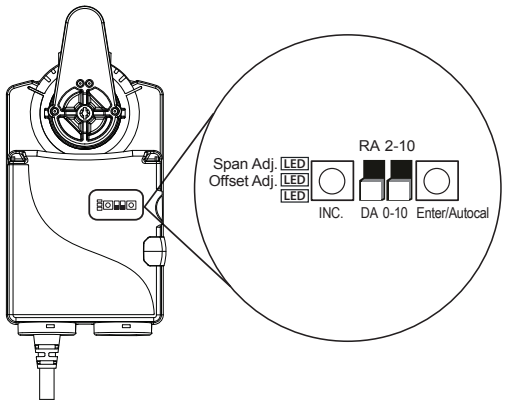
Auto Calibration Mode

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.

Example	Command Signal	Feedback Signal	Setting User Interface
1	0 to 10 VDC 24 VAC Floating or ON/OFF	Direct 0 to 10 VDC	
2	0 to 10 VDC 24 VAC Floating or ON/OFF	Reverse 0 to 10 VDC	
3	02 to 10 VDC 24 VAC Floating or ON/OFF	Direct 2 to 10 VDC	



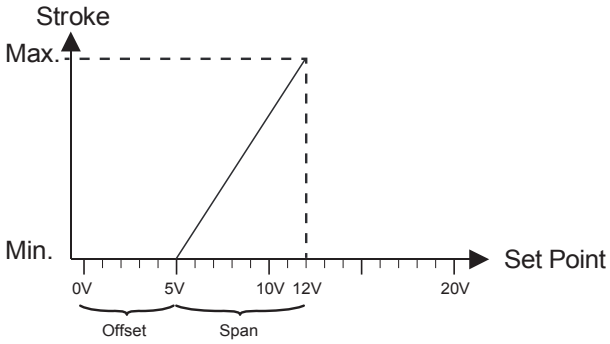
Remove the oval cover



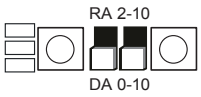
DIP Switches and LEDs Placement

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.

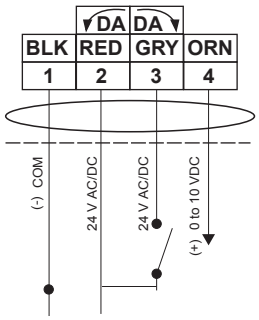
IMPORTANT: Do not press INC. Otherwise your observed SPAN voltage setting will change.

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

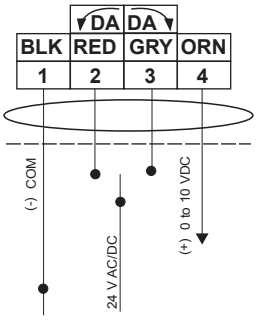
Clearing the SPAN and OFFSET Proportional Command Signal Voltage Setting

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

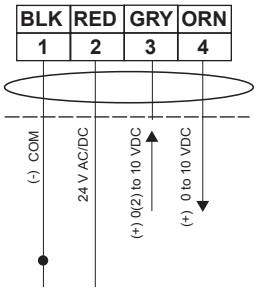
Wiring Diagrams



On/Off Control



Floating Control



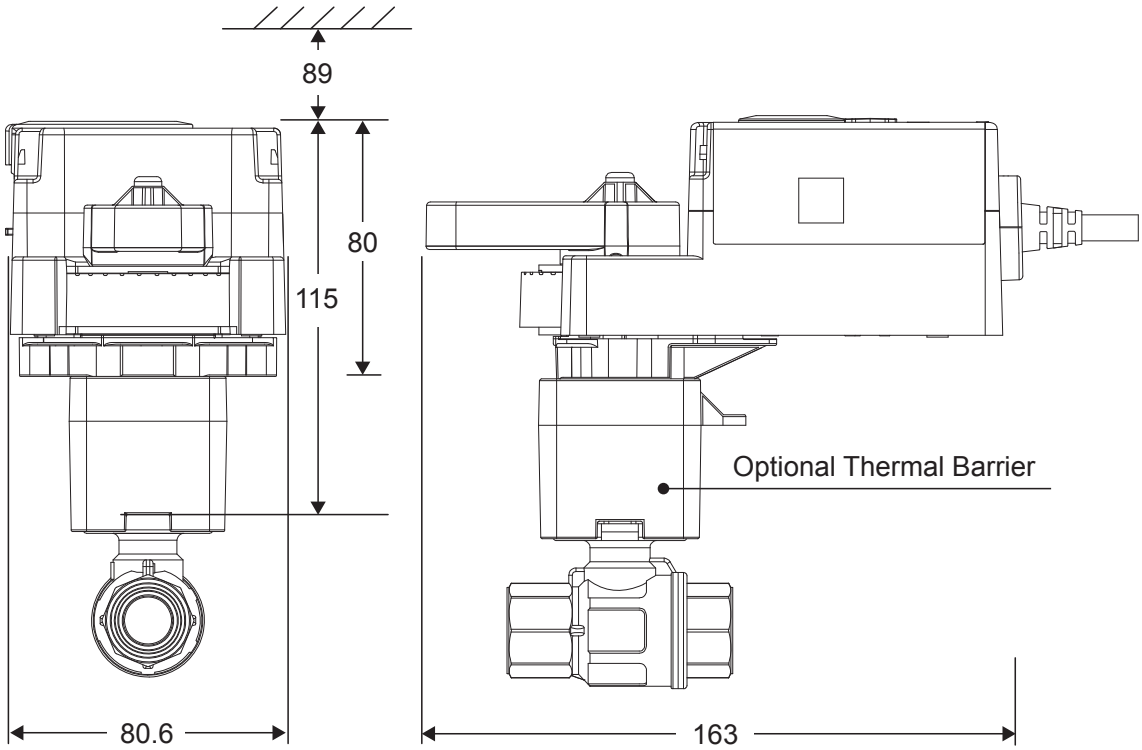
DC 0(2)...10 V Control

VA9310-HGA-1

Technical Specifications

Product Code	VA9310-HGA-1	
Control Type	**On/Off and Floating Mode**	**Proportional Mode**
Power Requirements	AC 24 V (AC 19.2 to 28.8 V) at 50/60 Hz, Class 2 (North America) or SELV (Europe), 6.2 VA Running DC 24 V (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	AC 19.2 to 28.8 V at 50/60 Hz or DC 24 V ±10% Class 2 (North America) or SELV (Europe)	DC 0 (2) to 10 V or 0 (4) to 20 mA with field furnished 500 Ohm 1/4 W resistor Offset: DC 0 to 10 V Span: DC 2 to 10 V
Control Impedance	4.7k ohm	100k ohm
Feedback Signal	DC 0 (2) to 10 V	
Running Torque	10 Nm (88 lb·in)	
Rotation Range	Mechanically Limited to 95° ±3°	
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), 90% 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)	**VG12x5 and VG18x5 Series:** -30 to 100 °C (-22 to 212 °F) **VG12x5 and VG18x5 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, Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive. IEC 60730-1: Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements and IEC 60730-2-14, Automatic Electrical Controls for Household and Similar Use; Part 2 - Particular Requirements for Electric Actuators **Australia and New Zealand:** RCM, Australia/NZ Emissions Compliant	

Dimensions



Accessories

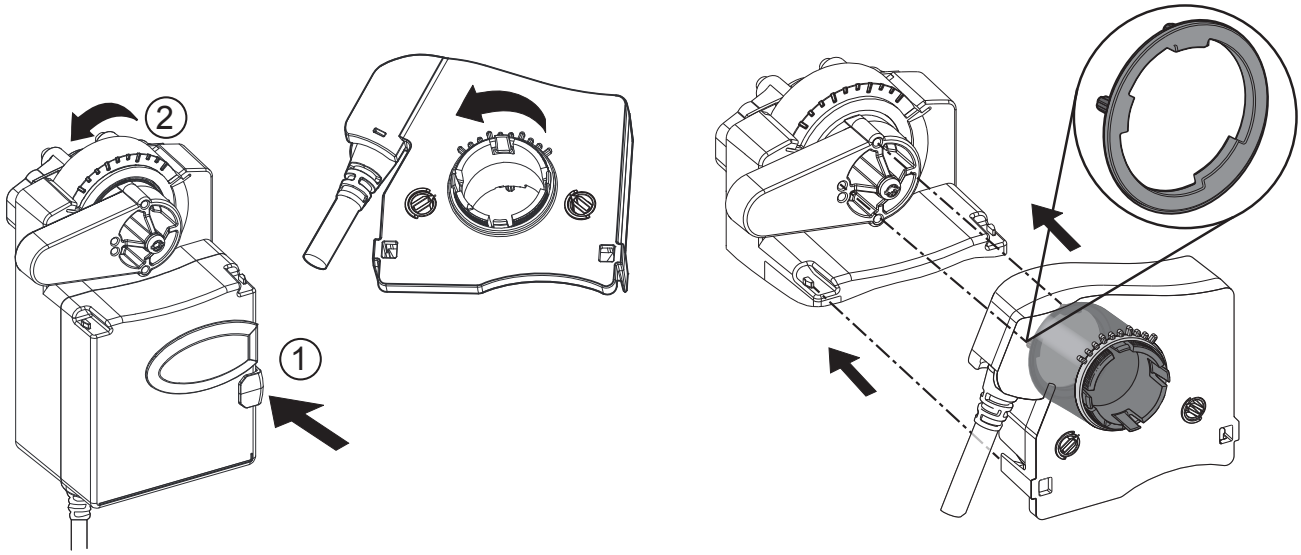
The VA9310 line has several kit and accessories that can be ordered separately and mounted on site.

Code Number	Description
M9000-200	Commissioning Tool that provides a control signal to drive 24 V on/off, floating, proportional and resistive electric actuators (quantity 1)
M9000-322	NEMA 4x, IP66/67 Weathershield Kit for damper application of M9104, M9310, M9203 and M9208 Series Electric Actuators (quantity 1)
M9000-342	NEMA 4X, IP66/67 Weathershield Kit for VG1000 Series Ball application of VA9104, VA9310, VA9203 and VA9208 Series Electric Actuators (quantity 1)
M9000-400	Jackshaft Linkage Adapter Kit (quantity 1)
M9000-561	Thermal Barrier Kit. Extends the VA9104, VA9310, VA9203 and VA9208 Series Electric Non-Spring Return Actuators applications to include low pressure steam (quantity 1).
M9000-604	Replacement Anti-Rotation Bracket Kit for M9310, M9203, M9208, M9210 and M9220 Series Electric Actuators
M9000-606	Position indicator for M9300 Kits (quantity 5)
M9300-1	Auxiliary Switch Kit (one single-pole, double-throw)
M9300-2	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
M9000-151	Remote Mounting Kit, with crank arm and damper linkage for M9108 (16) (24) and M9310 Series Actuators
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 M9310 Series Electric Actuators to VG1000 Series Valves (quantity 1)
M9310-600	Standard Coupler Kit, M9310 Series (9.525 to 19.05 mm - *3/8 to 3/4 in.*) (9.525 to 15.875 mm - *3/8 to 5/8 in.*) (quantity 1)

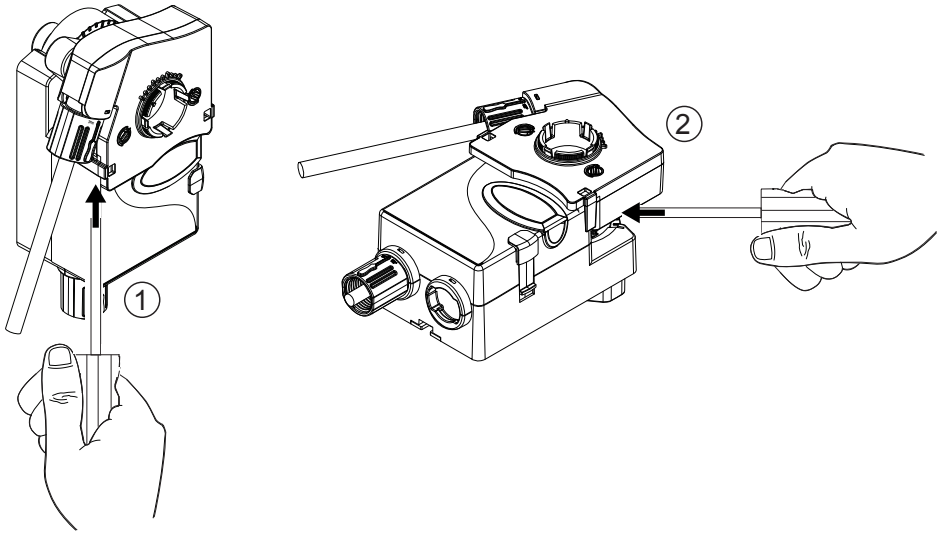
Auxiliary Switch & Potentiometer Feedback Kit

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 VA9310 actuators.

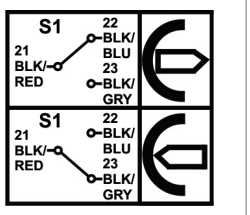


2. To remove the kit Place a screwdriver underneath the tab on each side of the actuator and firmly pull back the tab.

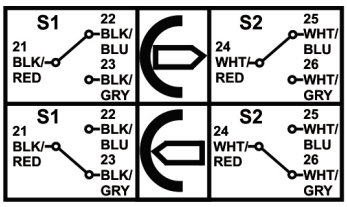


Auxiliary switches kits

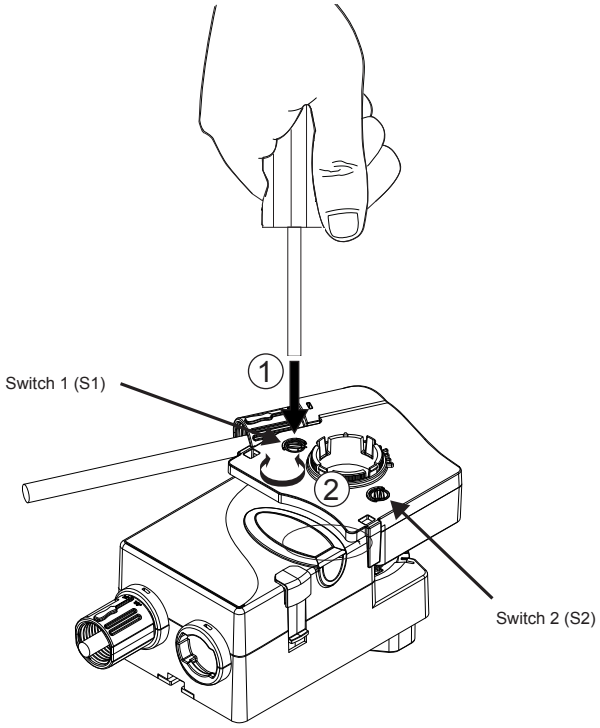
The auxiliary switches kits are used to notify starting and end position or to perform switching functions in any angular position. The switching points can be adjust by means of a dial.



M9300-1

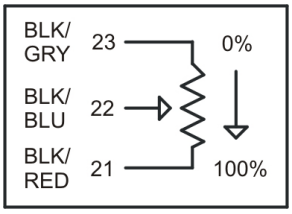


M9300-2



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