

# VA-9070 Series Electric Rotary Actuators for Two-Position and Modulating Service

## Installation Instructions

Code No. LIT-977322  
Issued May 29, 2007  
Supersedes March 14, 2005

### Mounting

When mounting the actuator in the standard position, orient the actuator with its handwheel in a vertical plane and parallel to the pipeline. When mounting the actuator on a vertical pipe, position the actuator with the conduit entries on the bottom to prevent condensation from entering the actuator by way of the conduit. In all cases, position the conduit to prevent drainage into the actuator.

Mount the actuator to the valve using the following procedure:

1. Manually operate the actuator until the output shaft of the actuator lines up with the valve stem. If possible, use an intermediate position (such as valve disc/stem and actuator half-open).
2. Place the proper sleeve adaptor (if required) onto the valve stem. Apply a small amount of grease to the sleeve adaptor to ease assembly.
3. Install the furnished mounting studs by threading them all the way into the actuator base. (Insert the short, threaded length into the actuator.)
4. Mount the actuator onto the valve stem. Be sure the mounting studs are properly aligned with the holes in the top plate of the valve or the mounting bracket. If necessary, manually override the actuator to align the mounting studs with the mounting holes.
5. Lower the actuator onto the valve, and secure it tightly in place with the furnished hex nuts and lock washers.

### Wiring

Connect the actuator to field wiring:

- The heaters use approximately 0.5 amperes at 110 volts.
- Remove the metal conduit plug for the power connection. Each actuator has two conduit entries (one for power and one for control). The remaining square-head conduit plug is weatherproofed but may eventually degrade. If the square-head conduit plug degrades, replace it with a metal plug.

- The motor full load current is noted on the nameplate of the actuator. The terminal strip accepts wire sizes ranging from 10 to 22 AWG (12 to 22 AWG for the servo). Do not use wire smaller than 18 AWG.
- Terminate all field wiring at the actuator terminal strip in accordance with the wiring diagrams attached to the inside of the actuator cover.
- Properly seal the conduit connections to maintain the weatherproofed integrity of the actuator enclosure.

### Setup and Adjustments

You must set the electrical travel switches to trigger prior to reaching the mechanical travel stops. The travel switches are labeled for open and close. The cams are color-coded (green for open; red for closed).

Manual travel stops are designed to prevent manual overtravel, not to stall the electric motor. The travel stops have an adjustment range of approximately 10 degrees.

#### **Closed Travel Switch and Travel Stop Adjustment**

1. Loosen the mechanical stop for the closed position, and back it off so that it does not interfere with actuator travel. The closed stop is located on the right when viewed from the travel stop side of the actuator.
2. Remove the indicator rotor by pulling it up. This action exposes the machined groove on the end of the camshaft, which is the reference for the valve disc position.
3. Manually operate the actuator handwheel Clockwise (CW) until the valve reaches the desired closed position.
4. Rotate the red adjusting knob (by hand or with a flat-head screwdriver) until the cam lobe barely trips the switch from a CW direction.

**Note:** If the rotation of one cam moves the other cam, hold the other knobs or cams during adjustment.

- With the travel switch in the closed position, rotate the handwheel one-half turn CW, then turn the closed travel stop CW until it bottoms out against the output gear. Lock the travel stop bolts.

### Open Travel Switch and Travel Stop Adjustment

Manually operate the actuator handwheel Counterclockwise (CCW) until the valve is fully open. Follow the same procedure as outlined in the *Closed Travel Switch and Travel Stop Adjustment* section, except use the **green** cam (open) and the travel stop located on the left side (as seen when viewed from the travel stop side of the actuator).

### Servo Commissioning

Ensure that the travel switches and travel stops are set properly before calibrating the servo. Use a controlled and known command signal source. Factory-installed servos are pre-calibrated.

### Setting the Input Control Signal

Set the input control signal for the input type used. See Table 1.

### Setting the Potentiometer

- Manually operate the actuator handwheel until the unit is in the fully closed position.
- Rotate the black potentiometer drive gear adjustment knob to barely engage the potentiometer gear segment at the closed position.
- Manually operate the actuator to the fully open position.
- Fine-tune the potentiometer adjustment at this end to equalize the difference between the ends. The potentiometer gear segment should maintain engagement with the drive gear throughout full actuator travel.

### Setting the Servo

- Wire the input signal to the incoming command signal terminals. Ensure that you maintain proper polarity when making wiring connections.
- Connect the power supply and activate the actuator.
- Check the Status Light-Emitting Diode (LED).
  - If the red Status LED is flashing, refer to the *Servo Troubleshooting* section in the *VA-9070 Series Electric Rotary Actuators Technical Bulletin (LIT-977325)*.
  - If the green Status LED is flashing, press and hold the CALIBRATE button until the green Status LED flashes rapidly (approximately 2 seconds), then release the CALIBRATE button. The servo drives the valve to the open and close travel limit switch settings. When the calibration is complete, the green Status LED resumes flashing at the normal rate.
  - If the Status LED alternately flashes red, then flashes green, the calibration has failed. To resolve the problem, refer to the *Servo Troubleshooting* section in the *VA-9070 Series Electric Rotary Actuators Technical Bulletin (LIT-977325)*.
- After calibration is complete, apply the desired minimum and maximum input signals, and observe the actuator operation through one full cycle for proper operation.

### Repair Information

If the VA-9070 Series Electric Rotary Actuators for Two-Position and Modulating Service fails to operate within its specifications, replace the unit. For a replacement VA-9070 Series actuator, contact the nearest Johnson Controls® representative.

**Table 1: Input Control Signal Switch Settings**

Switch	Input Signal			
	4 to 20 mA	DC 0 to 5 V	DC 0 to 10 V	DC 2 to 10 V
1	OFF	ON	ON	ON
2	OFF	OFF	ON	ON
3	OFF	OFF	OFF	ON



**Controls Group**  
507 E. Michigan Street  
Milwaukee, WI 53202

*Metasys® is a registered trademark of Johnson Controls, Inc. All other marks herein are the marks of their respective owners. © 2007 Johnson Controls, Inc.*