



### Application

The VA(M)24-35 Series Actuators are direct-mount, non-spring return electric valve actuators that operate on AC 24 V power. These synchronous, motor-driven actuators are used to provide accurate positioning on ST2 Series DN15, DN20, and DN25 (1/2, 3/4, and 1 in.) ball valves in Heating, Ventilating, and Air Conditioning (HVAC) applications.

The VA(M)24-35 Series Electric Non-Spring Return Actuators provide a running torque of 35 lb.in (4 Nm). The nominal travel time is 60 seconds at 60 Hz (72 seconds at 50 Hz) for 90° of rotation.

**IMPORTANT:** Use this VA(M)24-35 Series Actuator only to control equipment under normal operating conditions. Where failure or malfunction of the VA(M)24-35 Series Actuator could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the VA(M)24-35 Series Actuator.

### Installation

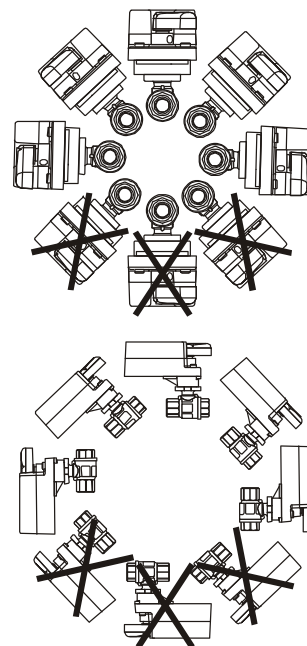
Install the ball valve with the actuator at or above the centerline of the horizontal piping (see Figure 1).

**IMPORTANT:** Before specifying VA(M)24-35 Series Electric Non-Spring Return Valve Actuators for plenum applications, verify acceptance of exposed plastic materials in plenum areas with the local building authority. Building codes for plenum requirements vary by location. Some local building authorities accept compliance to UL 1995, Heating and Cooling Equipment, while others use different acceptance criteria.

**IMPORTANT:** Do not install or use this VA(M)24-35 Series Electric Non-Spring Return Valve Actuator in or near environments where corrosive substances or vapors could be present. Exposure of the electric actuator to corrosive environments may damage the internal components of the device, and will void the warranty.

### Special Tool Needed

To install the actuator, use a digital voltmeter or a Commissioning Tool.



**Figure 1: Mounting Positions for Chilled Water and Condensing Atmosphere Applications**



## VA(M)24-35 Series — Installation Instructions - Continued

### Dimensions

See Figure 2 for dimensions of the Non-Spring Return VA(M)24-35 Actuated ST2 Series Ball Valve with linkage  
See Table 1 for specific model linkage dimensions.

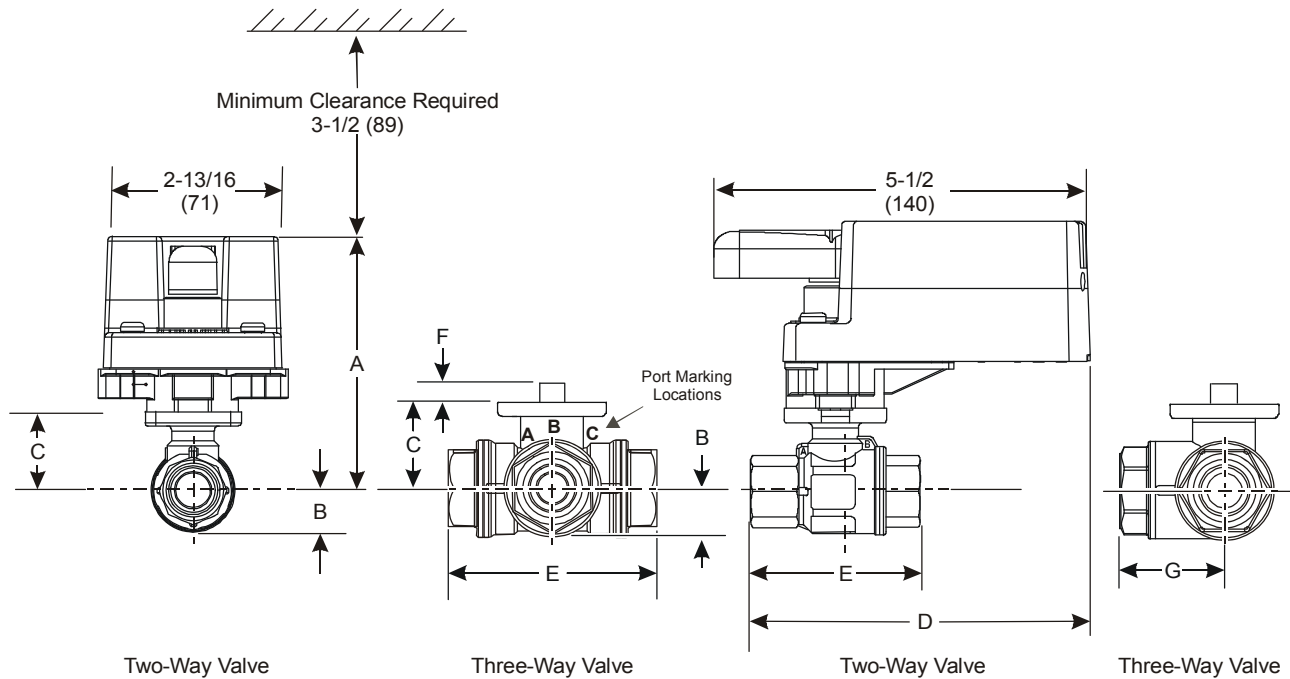


Figure 2: Non-Spring Return VA(M)24-35 Actuated ST2 Series Ball Valve with linkage - in.(mm)

Table 1: VA(M)24-35 Actuated ST2 Series Ball Valve with linkage - in.(mm)

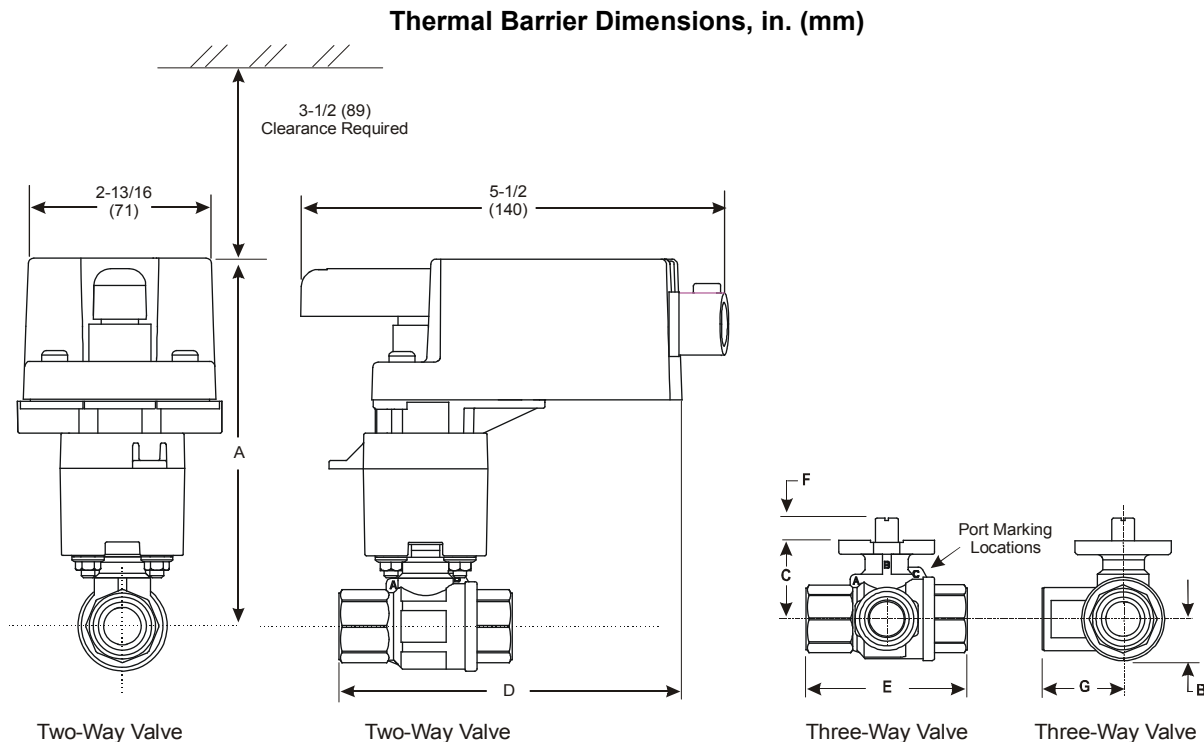
Valve Size, in. (DN) <sup>1</sup>	A	B	C	D	E	F	G
1/2 (DN15)	3-7/8 (98)	21/32 (17)	1-7/32 (31)	5-7/64 (129)	2-33/64 (64)	11/32 (9)	1-1/4 (32)
3/4 (DN20)	3-7/8 (98)	21/32 (17)	1-7/32 (31)	5-7/32 (133)	2-51/64 (71)	11/32 (9)	1-13/32 (36)
1 (DN25)	3-11/16 (100)	3/4 (19)	1-19/64 (33)	5-9/16 (141)	3-13/32 (87)	11/32 (9)	1-11/16 (43)

1. Port A must always be connected to the coil (Figure 2).



## Dimensions

See Figure 3 and Table 3 for VA(M)24-35 Valve with linkage Actuator dimensions with optional ST2-HT Thermal Barrier installed.



**Figure 3: Field-Installed VA(M)24-35 Series Electric Actuator Dimensions with Optional ST2-HT**

**Table 3: VA(M)24-35 Actuated ST2 Series NPT Ball Valves with Optional Thermal Barrier Installed Dimensions, in. (mm)**

Valve Size, in. (DN) <sup>1</sup>	A	B	C	D	E	F	G
1/2 (DN15)	5-11/32 (135)	21/32 (17)	1-7/32 (31)	5-7/64 (129)	2-33/64 (64)	11/32 (9)	1-1/4 (32)
3/4 (DN20)	5-11/32 (135)	21/32 (17)	1-7/32 (31)	5-7/32 (133)	2-51/64 (71)	11/32 (9)	1-13/32 (36)
1 (DN25)	5-27/64 (137)	3/4 (19)	1-19/64 (33)	5-9/16 (141)	3-13/32 (87)	11/32 (9)	1-11/16 (43)

1. Port A must always be connected to the coil (Figure 3).

## Accessories

**Table 4: Accessories (Order Separately)**

Code Number	Description
ST2-HT	Thermal Barrier Extends ST2 Series Electric Spring Return Actuator Applications to Include Low Pressure Steam (Quantity 1)



### Mounting

To mount the actuator:

- 1. Turn valve stem to position below.

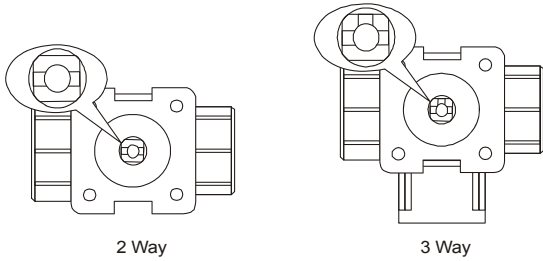


Figure 4: Positioning the Valve Stem

- 2. Mount optional ST2-HT Thermal Barrier to the valve if fluid temperature exceeds 212°F (100°C). See the Mounting the Thermal Barrier section for more information.

- 3. Place the handle to the top of the drive shaft (Figure 5). The handle is keyed on and can only be mounted in one orientation.

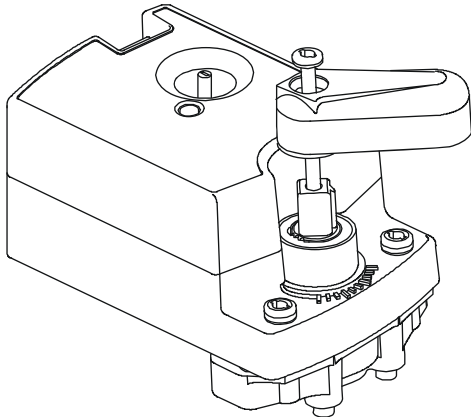


Figure 5: Installing the Handle

- 4. Check that the actuator coupler and handle are in the fully counterclockwise position as viewed from the top of the actuator. If not, press the actuator gear release and rotate the handle until the actuator coupler is fully counterclockwise.
- 5. Install the valve actuator over the ball valve mounting flange. Depending on the installation, position the assembly in any one of four 90° increments on the valve.

**Note:** For proper operation, the actuator must drive the valve counterclockwise to open Port A when viewed from above the valve.

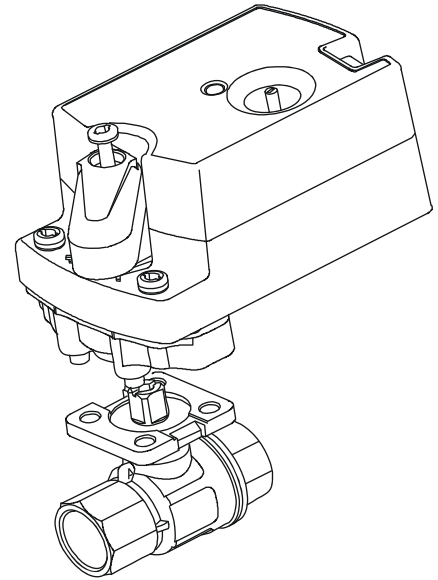


Figure 6: Coupling the Actuator to the Valve

- 6. To secure the actuator to the valve, use a 1/4 in. (6 mm) flat blade screwdriver. Recommended torque is 8 to 12 lb-in (0.9 to 1.4 N-m).

**IMPORTANT:** Do not overtighten the manual handle mounting screw. Overtightening may strip the threads resulting in damage to the valve stem threads.

### Mounting the Thermal Barrier

Figure 7 shows the optional ST2-HT Thermal Barrier.

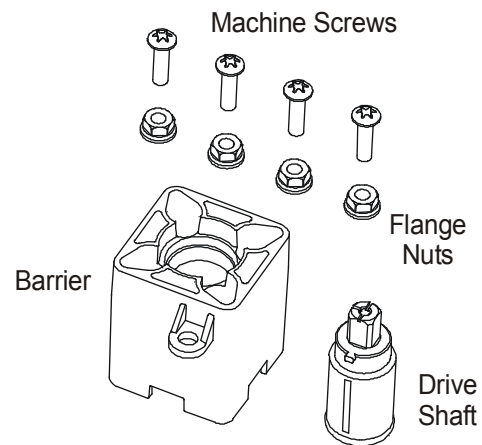


Figure 7: Optional ST2-HT Thermal Barrier



### Mounting the Thermal Barrier - Continued

To mount the optional thermal barrier:

1. Install the thermal barrier drive shaft into the thermal barrier by aligning the tab on the drive shaft with the slot on the thermal barrier (Figure 8).

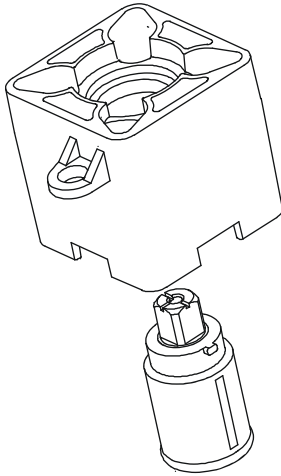


Figure 8: Installing the Drive Shaft into the Thermal Barrier

2. Rotate the drive shaft to align marks on the top of the thermal drive shaft with matching marks on the valve stem.

3. Mount the thermal barrier onto the valve using the four included M5x16 mm machine screws and four M5 flange nuts. Tighten the screws to a recommended torque of 21 to 25 lb-in. (2.4 to 2.8 N-m) (Figure 9).

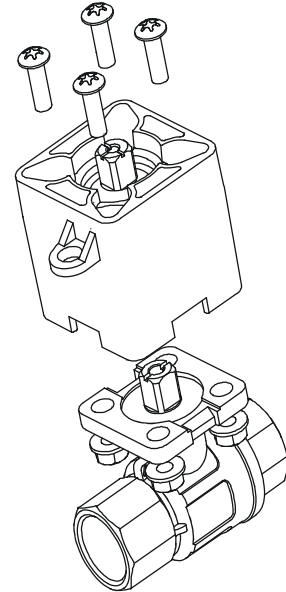


Figure 9: Installing the Barrier

4. Proceed to Mounting the Actuator. Follow the same steps as mounting directly to the valve when mounting the actuator to the thermal barrier.

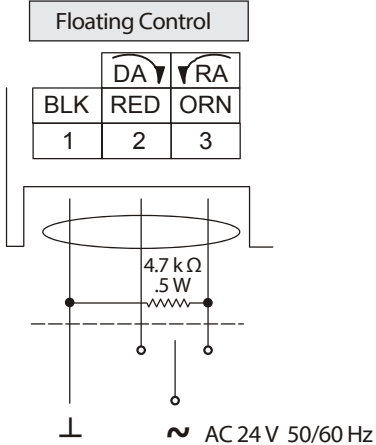
### Wiring - (Plenum Cable)

The VA24-35-P and VA24-35-PTO Series Electric Non-Spring Return valve actuators require an AC 24 V input signal and work with a variety of controllers. These electric actuators include an integrated 120 in. (3.05 m) long cable.

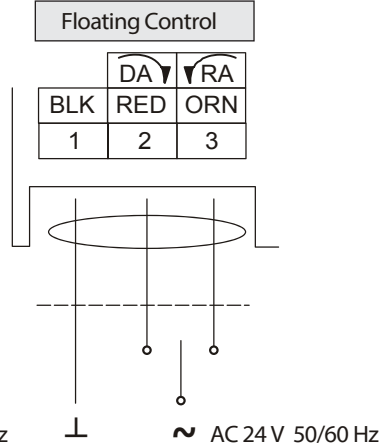
**Note:** For all VA24-35-P Series actuators, use a controller and/or software that provides a timeout function at the end of rotation (stall) to avoid excessive wear or drive time on the actuator motor.

When using the VA24-35-P with a controller featuring triac output, add a 4.7 Kohm, one .5 watt resistor between the common (black wire) and counter clockwise (orange wire).

#### VA24-35-P w/ triac



#### VA24-35-P



#### VA24-35-PTO

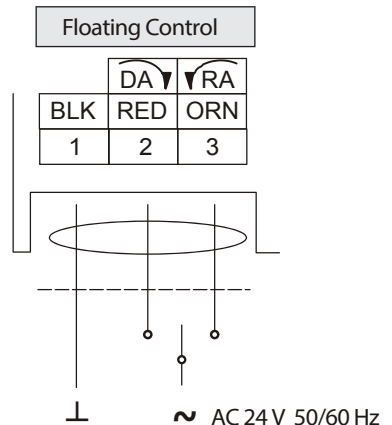
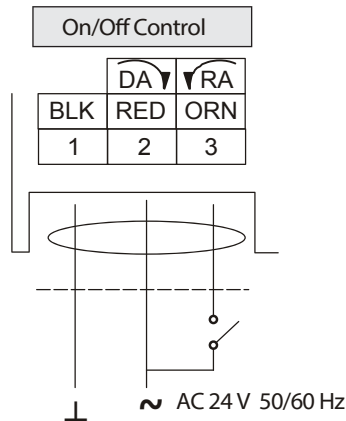


Figure 10: VA24-35-P and VA24-35-PTO Control Wiring Diagram

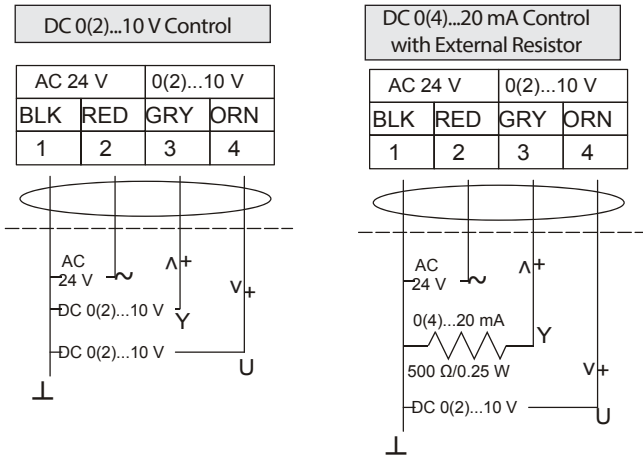


**Wiring Continued - (Plenum Cable)**

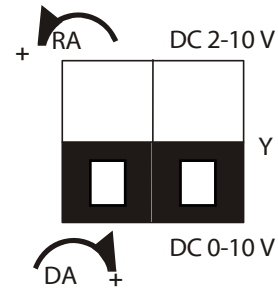
The VAM24-35-P Series Electric Non-Spring Return valve actuators require AC 24 V power and a DC 0(2) to 10 V or 0(4) to 20 mA controller input signal. These electric actuators include an integrated 120 in. (3.05 m) long cable; see Figure 11 for proper wiring.

For Reverse Acting (RA) operation, a minimum control signal drives the actuator to the full CW position and a maximum signal drives the actuator to the full CCW position. To change the factory settings, remove the actuator cover and adjust the switches on the circuit board as shown in Figure 12.

**VAM24-35-P**



**Figure 11: VAM24-35-P Control Wiring Diagram**



**Figure 12: VAM24-35-P Factory Switch Setting**

VAM24-35-P Actuators are factory set for Direct Acting (DA) mode and for a 0 to 10 VDC input control signal.

**CAUTION: Risk of Electric Shock.** Disconnect the power supply before making electrical connections to avoid electric shock.

**CAUTION: Risk of Property Damage.** Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

**IMPORTANT:** Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the electrical ratings of the VA(M)24-35 Series Electric Non-Spring Return Valve Actuator.

**Setup and Adjustments**

**Commissioning**

After wiring is complete, apply power to the Variable Air Volume (VAV) or Variable Air Volume and Temperature (VVT) controller and provide input signals to the actuator to drive it at least one complete cycle open and closed.

**Troubleshooting**

If the VA(M)24-35 Series Electric Non-Spring Return Valve Actuator is not responding or working properly:

- verify that the actuator assembly is properly secured to the valve.
- check that all electrical connections are complete and that power is applied.
- verify that the valve fully opens and closes, using the gear release button on the actuator and the manual override handle, shown in Figure 5.