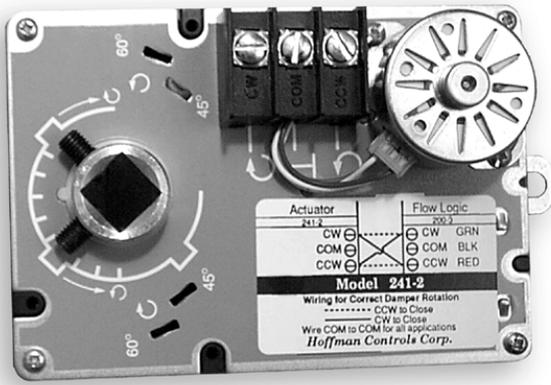


# Hoffman Controls

## Installation & Operating Instructions

## 241-2 Series Damper Actuator



**241-2 Damper Actuator**

### Description

The 241-2 Series actuator is designed for applications for regulating air volume or pressure in air distribution systems. The actuator is 24V AC and may be used as a floating controller by driving the shaft (CW) clockwise or (CCW) counterclockwise. Damper position is fixed when the motor is not energized.

Although the damper is designed to accept 1/2" round or square shafts an adapter is available for 3/8" shafts.

### Application

The actuator is factory positioned in the full CW position for 90° damper rotation. Stop pins for 60° and 45° travel are included but not installed. For CCW to close applications the actuator must be driven to the full CCW position before installing stop pins.

All 241-2 actuators can be secured by a single fastener allowing a "floating" mounting. Terminal block nomenclature indicates wiring connections for CW or CCW rotation. Angular rotation is 1° arc for 1 sec. This output rotation rate is not recommended for floating control from N.O./N.C. "center off" thermostats.

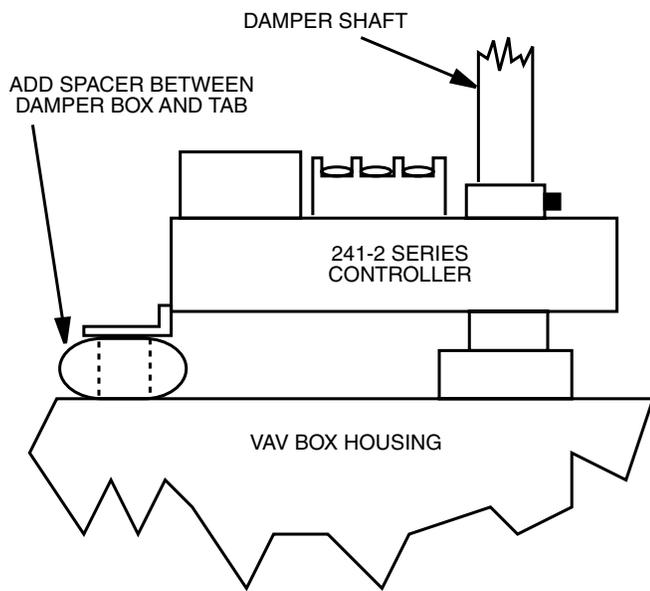
### Specifications

Volts, Input (-15%, +20%)	24V AC
Power	3VA
Frequency	50/60 Hz
Temperature, (Ambient)	
Minimum	+32°F
Maximum	+125°F
Humidity, RH (Non-condensing)	
Minimum	5%
Maximum	95%
Torque	
Run	35 in.-lb.
Stall (Minimum)	45 in.-lb.
Rotation Rate	1° arc/2 sec.
Shaft	
Nominal	1/2" (0.500 in.)
Optional	3/8" (0.375 in.)
Minimum Length	1.75 in.
U.L. Recognized	E4436
C.S.A. Certified	LR-95329

### Installation

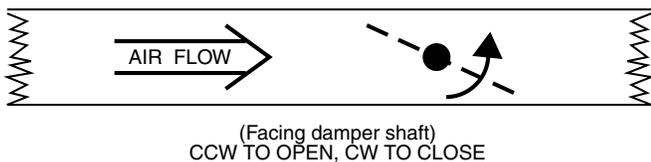
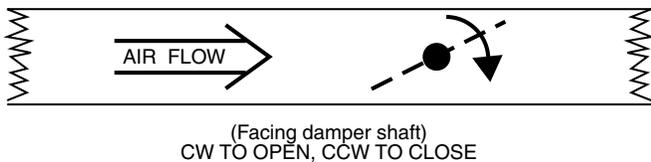
Install the actuator in non-corrosive, non-explosive atmospheres. Allow clearance for adequate mounting and servicing.

1. The 241-2 is designed to open a damper by driving the damper shaft in either the CW or CCW directions. The motor has a mounting tab at the bottom for securing to a damper box. The tab is sized for 1/4" self tapping sheet metal screws (not included).
2. The 241-2 is shipped in the full CW 90° position as viewed from the end of the damper shaft.
3. The 241-2 can be mounted with the motor shaft in any position as long as the motor is flush with the VAV box or damper housing. Failure to do so might cause unbalanced gear wear and could result in premature failure. In the event the motor cannot be mounted flush, add a spacer or washer between the mounting tab and the damper housing (See Figure 1).



**Mounting 241-2 to VAV Box When Motor Is Not Flush To The Box**  
**Figure 1**

4. Before mounting the 241-2 to the damper shaft determine the following:
  - a. The size of the damper shaft (3/8" or 1/2").
  - b. The direction the damper shaft moves to open the damper shaft (CW or CCW) (see Figure 2).
  - c. The angle of the damper closing (45°, 60°, or 90°).

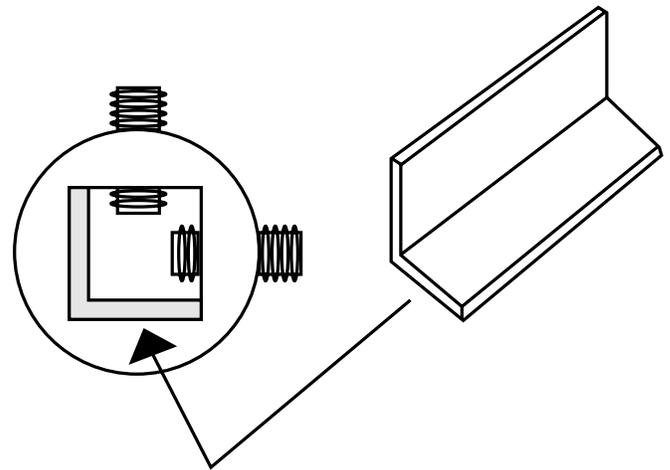


**Determining the Direction of Damper Opening**  
**Figure 2**

5. If the damper shaft is 3/8" round, or square, use the shaft adapter which is provided inside the bag assembly shipped with the motor. Insure the adapter is placed opposite the set screws (See Figure 3).
6. The damper shaft adapter centers a 3/8" damper shaft in the hub. Failure to use the adapter may cause the mounting tab to work loose. A 1/2" damper shaft does not require use of the adapter.
7. Once the direction has been determined (CW or CCW) to open, place motor onto damper shaft.

If the angle of damper opening is 60° close the motor by energizing the appropriate terminals (See Figure 3) until the motor gear train passes the 60° setting. (The pin cannot be inserted until the motor has passed this point.)

Insert the range stop pin (in the bag assembly shipped with the motor) into the appropriate (CW or CCW) slot. The range stop pin is clipped into its final position only after the pin passes through both actuator plates (See Fig. 4). The range stop pin is not required for 90° dampers.



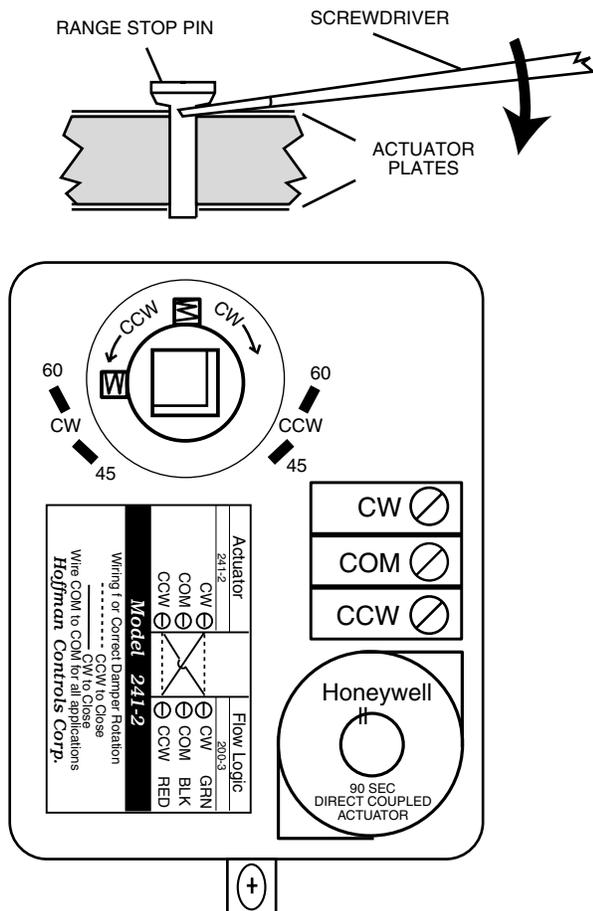
**Using Damper Shaft Adapter for 3/8" Damper Shafts**  
**Figure 3**

8. If the angle of the damper opening is 45° energize the motor such that it rotates past the 45° setting. Insert the range stop pin into the appropriate (CW or CCW) 45° slot.
9. With the motor placed in its final closed position, secure the mounting tab with a sheet metal screw to the damper box. Position the damper in the closed position and tighten the allen screws securely onto the damper shaft.

10. When a range stop pin is used with a field added auxiliary switch, the tab (top of pin) must point inward towards the damper shaft. This will allow clearance for the auxiliary switch housing.
11. To take a range stop pin out of its slot (45° or 60°) use a screwdriver to pry the pin loose (see Figure 4).
12. Certain 241-2 models come equipped with two tapped holes located in the plastic housing at the top of the actuator. These holes can be used with the minimum position setscrew packaged inside Bag Assembly. The setscrew will provide for a 0 to 25 degree minimum position adjustment. It is designed to prevent VAV box closeoff. Select the proper CW or CCW tapped hole and install the setscrew to the desired position.

### CAUTION

To prevent damaging a light duty damper, insure the proper range stop is selected.



Range Stop Pin Properly Inserted  
Figure 4

## Wiring

1. Disconnect power supply before connecting wires to prevent electrical shock or equipment damage.
2. All wiring must comply with local and electrical codes, ordinances and regulations. Voltage and frequency of the transformer used with the 241-2 must correspond to the characteristics of the power supply and those of the motor. Screw terminals are provided for easy hookup.
3. Maximum 18 gauge wire may be used to wire to the terminal leads on the 241-2 actuator.

## General Applications, VAV Systems

VAV systems control the temperature within a space by varying the volume of supply air. Air is typically delivered to the space at a fixed temperature. The volume of supply air is controlled by the space thermostat modulating the supply air damper.

When both heating and cooling is required in a zone, it is accomplished by providing alternately hot or cold air, or with reheat capability in the air terminal units. As individual zones approach minimum flow the total air flow in the system is regulated by a central duct static pressure controller.

The fan system is sized to handle an average peak load. Zone flow requirements peak at a different times of day, extra air is borrowed from the off-peak zones. This transfer of air from low-load to high-load zones occurs only in pressure independent VAV systems.

In pressure independent systems, individual zone air flow sensors are used to maintain the zone air flow rate regardless of fluctuation in the total system pressure.

Pressure independent systems, when used with controllers such as the 200-2 Series flow logic react faster to changes in air flow and demand. Therefore, these systems can use the 90 second/90° arc model.

Pressure dependent systems do not incorporate an individual zone air flow sensor and depend on a stable system pressure to maintain flow. These systems require slower motor models which are typically controlled by SPDT floating wall thermostats.

### CAUTION

241-2 Series actuators are 90 sec./90° arc models. DO NOT USE this model actuator with SPST floating type wall thermostats.