



## DC(M)24-310 Series — Installation Instructions

11/20/19

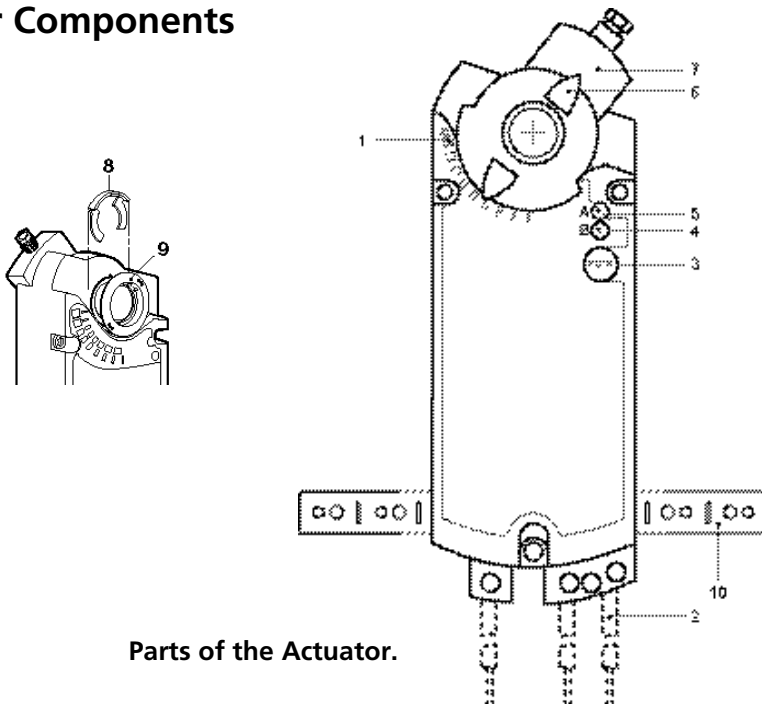
### Applications

These actuators are used in constant or variable air volume installations for the control of return air, mixed air, exhaust, and face and bypass dampers requiring up to 310 lb-in (35 Nm) torque.

### Features

- Unique self-centering shaft coupling
- All metal housing
- Manual override
- Independently adjustable dual auxiliary switches available
- Built in potentiometer option
- Two torque ranges available
- UL, CE and cUL listed

### Actuator Components



Parts of the Actuator.

### Legend

1. Positioning scale for angle of rotation
2. Connection cables
3. Manual override
4. Auxiliary switch B
5. Auxiliary switch A
6. Position indicator
7. Self-centering shaft adapter
8. Shaft adapter locking clip
9. Position indicator adapter
10. Mounting bracket

### Operation

A floating control signal controls the damper actuator. The actuator's angle of rotation is proportional to the length of time the signal is applied. A 24 Vac control signal to wires 1 and 6 (G-Y1) causes the actuator coupling to rotate clockwise. A 24 Vac control signal to wires 1 and 7 (G-Y2) causes the actuator coupling to rotate counterclockwise.

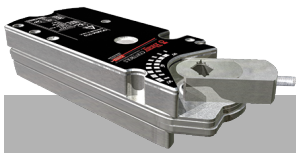
If you want to reverse the direction of rotation, wires 6 and 7 (Y1 and Y2) may be interchanged. Reverse the position indicator so that the counterclockwise 0 to 90 scale is visible.

In the event of a power failure or with no control voltage, the damper actuator holds its position.

In the event of a blockage in the damper, the actuator is overload protected over the full range to prevent damage to the actuator.

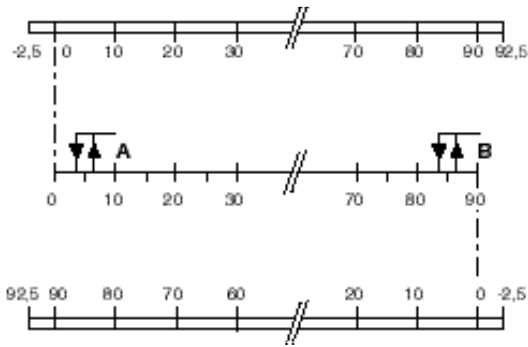
### Life Expectancy

An improperly tuned loop will cause excessive repositioning that will shorten the life of the actuator.



## DC(M)24-310 Series — Installation Instructions - Continued

### Dual Auxiliary Switches



Actuator Scale: Clockwise

Adjustment range for Switches A and B  
Setting interval: 5° Switching hysteresis: 2°

Actuator Scale: Counterclockwise

**Figure 14. Adjustable Switching Values for the Dual Auxiliary Switches.**

NOTE: The auxiliary switch setting shafts rotate with the actuator. The scale is valid only when the actuator is in the "0" position on clockwise motion. Use the long arm of the † to point to the position of switch A. Use the narrower tab on the red ring to point to the position of switch B.

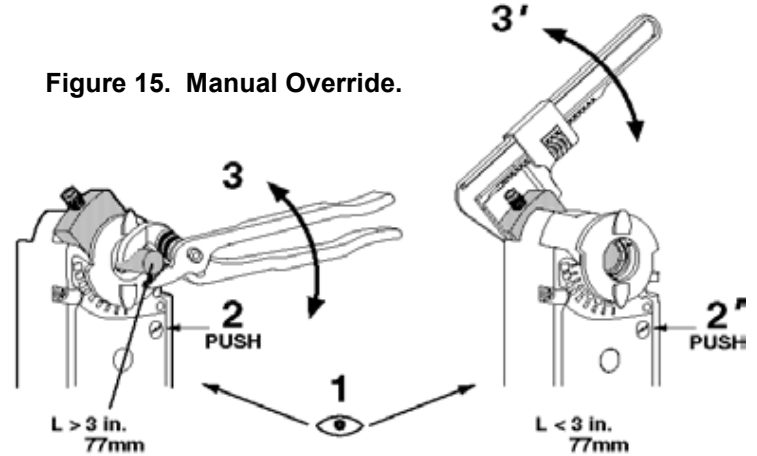
### Manual Override

To move the damper blades and lock the position with no power present:

1. Determine damper rotation: clockwise or counterclockwise.
2. Hold down the PUSH button.
3. Make adjustments to the damper position.
4. Release the PUSH button.

Once power is restored, the actuator returns to automated control.

**Figure 15. Manual Override.**



### Mechanical Range Adjustment

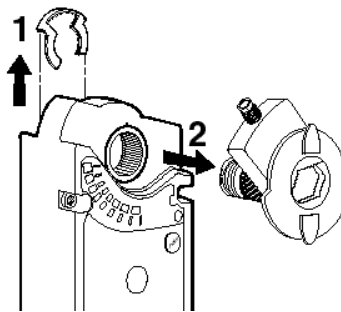
The angular rotation is adjustable between 0 and 90° at 5-degree intervals. The range of shaft movement is limited by mounting the shaft adapter:

Begin by loosening the shaft adapter from the damper shaft and remove the actuator from the damper shaft.

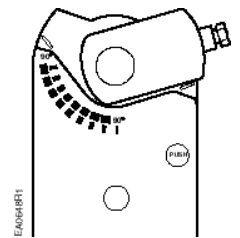
1. Remove clip.
2. Remove shaft adapter from the actuator.
3. Return the actuator gear train to the "0" position using the following steps for the clockwise or counterclockwise damper shaft rotation.

#### Clockwise-to-open:

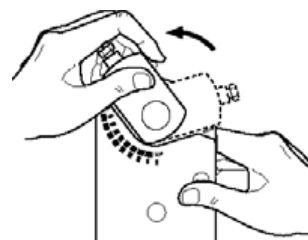
- a. Insert the shaft adapter to the right as close as possible to the raised stop. See Figure 17.
- b. Hold down the **PUSH** button and rotate the shaft adapter to the left until it stops. See Figure 18.
- c. Release the **PUSH** button.
- d. If the shaft adapter is not resting against the left raised stop, remove the adapter and insert it against the left stop.
- e. Place the position indicator to the "0" position on the outside scale. See Figure 19.



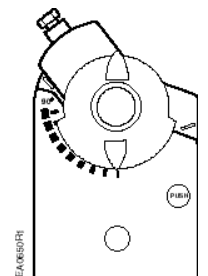
**Figure 16.**



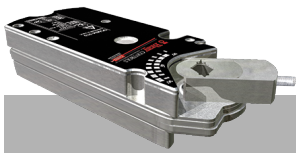
**Figure 17.**



**Figure 18.**



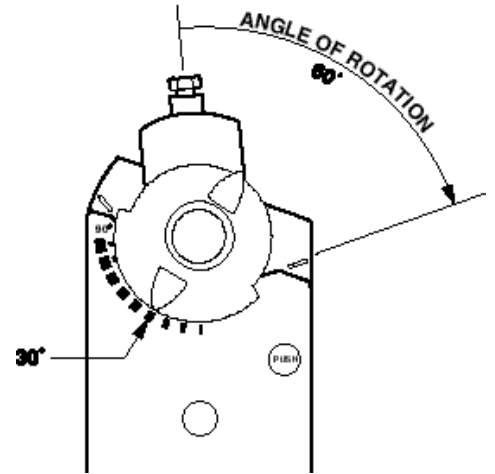
**Figure 19.**



## Mechanical Range Adjustment, Continued

### Counter-Clockwise-to-open:

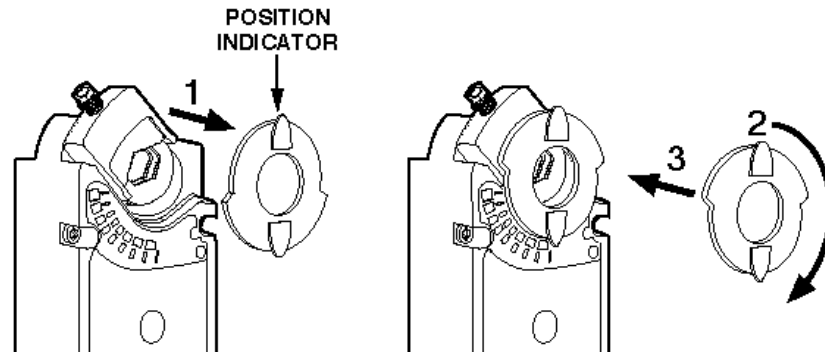
- a. Insert the shaft adapter to the left as close as possible to the raised stop.
  - b. Hold down the **PUSH** button and rotate the shaft adapter to the right until it stops.
  - c. Release the **PUSH** button.
  - d. If the shaft adapter is not resting against the right raised stop, remove the adapter and insert it against the right stop.
  - e. Place the position indicator to "0" on the inside scale.
4. Determine the angle of rotation for the damper blade shaft. Subtract that amount from 90°.
  5. Remove the shaft adapter and insert it with the position indicator pointing to the mark on the scale calculated in the previous step. See Figure 20.
  6. Attach the clip.
  7. Rotate the damper blade shaft to its "0" position.
  8. Return the actuator to the damper shaft and tighten the shaft adapter to the damper shaft.



**Figure 20. Mechanical Range Adjustment**

## Reversing the Position Indicator

Reverse the position indicator so that the counterclockwise 0 to 90 scale is visible.



**Figure 21. Position Indicator**

## Wiring

All wiring must conform to NEC and local codes and regulations.

Use earth ground isolating step-down Class 2 transformers. Do not use autotransformers.

The maximum rating for a Class 2 step-down transformer is 100 VA. Determine the supply transformer rating by summing the VA ratings of all actuators and all other components used.

It is recommended that one transformer does not power more than 10 actuators.



### WARNING

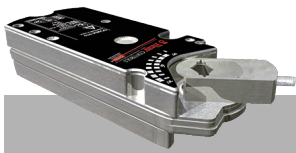
Mixed switch operation is not permitted to the switching outputs of both auxiliary switches (A and B).

Either AC line voltage from the same phase must be applied to all six outputs of the dual auxiliary switches, or UL-Class 2 voltage must be applied to all six outputs.

**NOTE:** With plenum cables, only UL-Class 2 voltage is permitted.



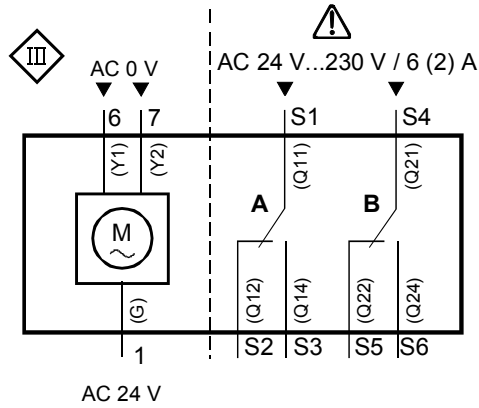
**CAUTION:** Do not parallel wire actuators with other type of actuator including actuators with date codes earlier than 501.



## DC(M)24-310 Series — Installation Instructions - Continued

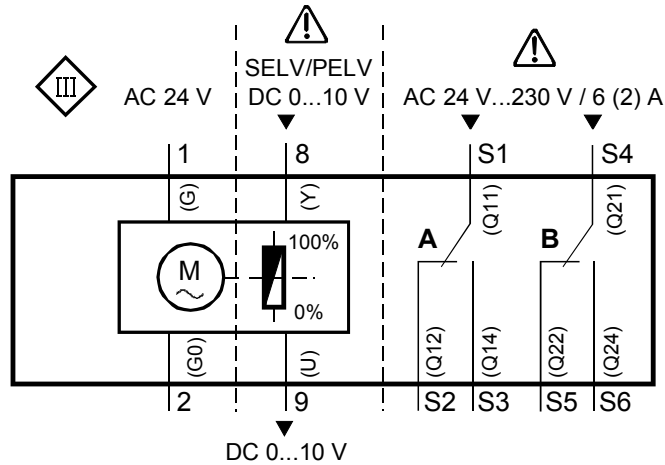
### Wiring, Continued

#### Floating Control



AC 24 V

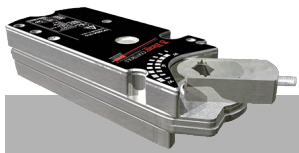
#### Modulating Control



DC 0...10 V

### Wire Designations

Cable			Function
No.	Code	Color	
1	G	Red (RD)	AC 24 V Supply (SP)
6	Y1	Violet (VT)	Control Signal Clockwise AC 0 V
7	Y2	Orange (OG)	Control Signal AC 0 V Counterclockwise
Auxiliary Switch - Factory Installed			
S1	Q11	Gray/Red (GY RD)	Switch A Input
S2	Q12	Gray/Blue (GY BU)	Switch A - N.C.
S3	Q14	Gray/Pink (GY PK)	Switch A - N.O.
S4	Q21	Black/Red (BK RD)	Switch B Input
S5	Q22	Black/Blue (BK BU)	Switch B - N.C.
S6	Q24	Black/Pink (BK PK)	Switch B - N.O.



## Start-Up/ Commissioning

### 1. Check the Operation:

- a. Connect wires 1 (red), 6 (violet), and 7 (orange) to the actuator.
- b. Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet).
- c. Allow the actuator shaft coupling to rotate from 0 to 90°.
- d. Stop applying a control signal to wires 1 (red) and 6 (violet).
- e. Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange).
- f. Allow the actuator shaft coupling to rotate from 90 to 0°.

### 2. Check the Feedback:

- a. Set the DMM dial to ohms.
- b. Connect wires P1 and P2 to the DMM. The DMM should indicate a resistive value.
- c. Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet).  
The reading of the DMM should increase.
- d. Stop applying a control signal to wires 1 (red) and 6 (violet).
- e. Connect wires P2 and P3 to the DMM. The DMM should indicate a resistive value.  
Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange). The reading of the DMM should increase.

### 3. Check the Auxiliary Switch A:

- a. Set the DMM dial to ohms (resistance) or continuity check.
- b. Connect wires S1 and S3 to the DMM. The DMM should indicate an open circuit or no resistance.
- c. Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet).  
The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.
- d. Stop applying a control signal to wires 1 (red) and 6 (violet).
- e. Connect wires S1 and S2 to the DMM. The DMM should indicate an open circuit or no resistance.
- f. Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange).  
The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch A.

### 4. Check the Auxiliary Switch B:

- a. Set the DMM dial to ohms (resistance) or continuity check.
- b. Connect wires S4 and S6 to the DMM. The DMM should indicate an open circuit or no resistance.
- c. Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet).  
The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.
- d. Stop applying a control signal to wires 1 (red) and 6 (violet).
- e. Connect wires S4 and S5 to the DMM. The DMM should indicate an open circuit or no resistance.
- f. Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange).  
The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of switch B.