Product Description
These installation instructions describe the steps for direct-coupled mounting of the 44 lb-in MF41-6043 and MS41-6043, and 88 lb-in MF41-6083 and MS41-6083 Series Non-Spring Return Rotary Electronic Damper SmartX Actuators.

Product Numbers
Three-position control: MF41-6043, MF41-6083, MF41-6083-502, and MF41-6083-510
Modulating control: MS41-6043, MS41-6083, MS41-6083-520, MS41-6083-522, and MS41-6083-502

Required Tools
- 4 mm hex wrench
- 4 mm (5/32-inch) drill bit and drill
- Small flat-blade screwdriver
- Marker or pencil

Estimated Installation Time
30 minutes

Warning/Caution Notations

Caution: Equipment damage or loss of data may occur if you do not follow a procedure as specified.

Warning: Personal injury may occur if you do not follow a procedure as specified.
Actuator Components

Legend
- a. Actuator
- b. Position indicator
- c. Anti-rotation bracket
- d. Mounting screws for anti-rotation bracket
- e. 4 mm hex key
- f. Shaft insert for use with 3/8-inch (8-10 mm) shafts

Figure 1. Parts of the Rotary SmartX Actuator.

![Image of actuator parts]

**Warning:** Do not open the actuator.

Instructions

**Note:** Place the actuator on the damper shaft with the front of the actuator accessible. The label is on the front side.

1. Determine whether the damper blades will rotate clockwise or counterclockwise to open. See Figure 3.

2. If the blades will rotate counterclockwise, slide the manual override switch to manual, and move the adjustment lever to the right. Return the switch to automatic. See Figure 2.

3. To mount a (modulating) MS41-6043 or MS41-6083 Series actuator, set the Dual In-line Package (DIP) switches to the required positions. See Figure 3.

4. To access the DIP switches, raise the tab on the lower left side of the actuator’s face. See Figure 3. The factory setting is clockwise (middle switch), with a direct-acting feedback signal (right switch).

5. Close the tab over the DIP switches.

6. To mount a (3-position) MF41-6043 or MF41-6083 Series actuator for counter-clockwise rotation, follow the Counterclockwise Damper Rotation instructions located in the Wiring Diagrams section when wiring the actuator to the controller.
Figure 3. Setting the Direction of Rotation.

Note: For DIP switch setting options, see the General Instructions F-27213-1 (MF41-6043/6083) and F-27214-1 (MS41-6043/6083).

Mounting and Installation

The SmartX Actuator comes with a factory installed 1/2-inch shaft guide. If shaft size is 5/8-inch, skip Figure 5 and proceed with the instructions in Figure 6.

1. Remove factory installed 1/2-inch guide. See Figure 4.
A 3/8-inch shaft adapter is provided in actuator package.

2. Hold the shaft insert so that the raised tabs are inserted last when placing the insert into the back of the actuator. Proceed to Figure 6, step 2.

Figure 5. 3/8-inch Ø Shaft.

1. Remove factory installed 1/2-inch guide. See Figure 4.
2. Mount actuator to shaft per Figure 6.

Figure 6. 5/8-inch Ø Shaft.
Mounting and Installation, Continued

Manual Override

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

1. Slide the red manual override knob toward the back of the actuator.
2. Make adjustments to the damper position.
3. Slide the red manual override knob toward the front of the actuator.

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

Dual Auxiliary Switch Setting

For MF41-6083-502, MS41-6083-502, and MS41-6083-522, only.

Factory setting:
A = 5°  B = 85°

Use a flat-blade screwdriver to adjust the A switch. The long arm of the “†” points to the setting. Manually turn the red ring of the B switch. The narrower tab on the ring points to the setting. See Figure 10.

**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. Invert scale for counterclockwise rotation.

![Figure 7. Mounting the Actuator to the Damper Shaft.](image7)

![Figure 8. Installing the Position Indicator (b).](image8)

![Figure 9. Attaching the Anti-rotation Bracket.](image9)

![Figure 10. Manual Override.](image10)

![Figure 11.](image11)
Mechanical Range Adjustment

1. Loosen the stop set screw.
2. Move it along the track to the desired position, and fasten it in place.

Mechanical range limitation and self-adapt feature.
1. To use the entire 0 to 10V input signal to control the adjusted range, raise the tab located on the lower left-hand side of the actuator and locate the DIP switches. See Figure 3.
2. Set the self-adapt DIP switch to (ON). See Figure 13.
3. Close the tab over the DIP switches.

For example, if you set the locking screw at 70° and turn the self-adapt switch ON, a 5V input signal will drive the damper to 35° (50% of its adjusted range).

Caution: When turning the self-adaptive feature on, or after a software reset with the feature on, the actuator will enter a five-minute calibration cycle as the actuator adjusts to the rotation limits of the system. A software reset happens after power on, or may be caused by electrostatic discharge (ESD) at levels of 2kV and above.

Slope (Span) and Offset Adjustment

For MS41-6083-520 and MS41-6083-522 only.

Factory setting:
- Slope (span) ΔU = 10
- Offset Uo = 0

Use a flat-blade screwdriver to make adjustments. The long arm of the “†” points to the setting.
Wiring

- All wiring must conform to NEC and local codes and regulations.
- Use earth ground isolating step-down Class 2 transformers. Do not use auto transformers.
- Determine the supply transformer rating by summing total VA of all actuators used. It is recommended that one transformer power no more than 10 actuators.

**Warning:** Installations requiring CE Conformance
- All wiring for CE rated actuators must only be separated extra low voltage (SELV) or protective extra low voltage (PELV) per HD384-4-41.
- Use safety-isolating transformers (Class III transformer) per EN 61558. They must be rated for 100% duty cycle.
- Overcurrent protection for supply lines is maximum 10A.

Wiring Diagrams

**MF41-6043 and MF41-6083 Series**

24 Vac power supply Three-position control 24 Vac

Each wire has the standard symbol printed on it. See Table 1

**Counterclockwise Damper Rotation of MF41-6043 and MF41-6083 Series**

If the damper blades turn counterclockwise to open (CCW), reverse the 6 (violet) and 7 (orange) wires at the controller.

**Caution:** Do not wire different types of actuators (such as MF41-6153 Series) in parallel with these models.

**Figure 15. Three-position Control.**

### Table 1. Three-position Control 24 Vac.

<table>
<thead>
<tr>
<th>Standard Symbol</th>
<th>Function</th>
<th>Color</th>
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<tbody>
<tr>
<td>1</td>
<td>Supply (SP)</td>
<td>Red</td>
</tr>
<tr>
<td>6</td>
<td>Control signal clockwise</td>
<td>Violet</td>
</tr>
<tr>
<td>7</td>
<td>Control signal counterclockwise</td>
<td>Orange</td>
</tr>
</tbody>
</table>

#### Factory-installed Options

- S1: Switch A Common
- S2: Switch A NC
- S3: Switch A NO
- S4: Switch B Common
- S5: Switch B NC
- S6: Switch B NO
- P1: Feedback Potentiometer 0 to 100% P1 - P2
- P2: Feedback Potentiometer Common
- P3: Feedback Potentiometer 100 to 0% P3 - P2

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MS41-6043 and MS41-6083 Series

24 Vac power supply 0 to 10V modulating control
Each wire has the standard symbol printed on it. See Table 2.

Figure 16. 0 to 10V Modulating Control.

Table 2. Modulating Control.

<table>
<thead>
<tr>
<th>Standard Symbol</th>
<th>Function</th>
<th>Color</th>
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<tbody>
<tr>
<td>1</td>
<td>Supply (SP)</td>
<td>Red</td>
</tr>
<tr>
<td>2</td>
<td>Neutral (SN)</td>
<td>Black</td>
</tr>
<tr>
<td>8</td>
<td>0 to 10V input signal</td>
<td>Gray</td>
</tr>
<tr>
<td>9</td>
<td>Output for 0 to 10 Vdc position indication</td>
<td>Pink</td>
</tr>
<tr>
<td>S1</td>
<td>Switch A Common</td>
<td>Black</td>
</tr>
<tr>
<td>S2</td>
<td>Switch A NC</td>
<td></td>
</tr>
<tr>
<td>S3</td>
<td>Switch A NO</td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>Switch B Common</td>
<td></td>
</tr>
<tr>
<td>S5</td>
<td>Switch B NC</td>
<td></td>
</tr>
<tr>
<td>S6</td>
<td>Switch B NO</td>
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</tbody>
</table>
References

Electronic Damper SmartX Actuators
MS41-6043/MS41-6083 Series
Non-Spring Return Rotary
24 Vac Modulating Control
General Instructions

Electronic Damper SmartX Actuators
MF41-6043 /MF41-6083Series
Non-Spring Return Rotary
24 Vac Three-Position Control
General Instructions

Dimensions

Figure 17. Dimensions of SmartX Actuator and Anti-rotation Bracket.
Dimensions in Inches (Millimeters).