

D-3153 with Universal Mounting Bracket Installation

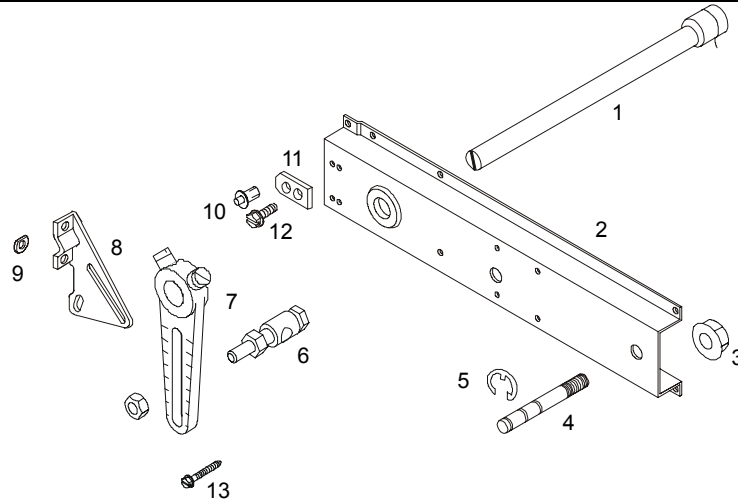


Figure 1: Component Identification

Table 1: List of Components

Item	Description	Quantity	Item	Description	Quantity
1	Blade Pin Extension	1	8	Blade Arm	1
2	Universal Mounting Bracket	1	9	Spacers for 16-gauge Blades	2
3	Flange Nuts	2	10	1/4 inch Diameter x 13/32 inch Drive Rivet	1
4	Pivot Post	1	11	Reinforcement Link	1
5	E-ring Clip, 1 spare	3	12	No. 12-24 x 1/2 inch Thread-forming, Hex-head Screws	5
6	Swivel Ball Joint w/ Nut	1	13	No. 12 x 1 inch Type AB Screws, Pan-head	6
7	Crank Arm	1	--	Actuator (not shown)	1

Individual Parts

- Item 1 is available as kit DMPR-KC003.
- Item 2 is available as kit DMPR-KC251.
- Item 3 is available as D-3153-112.
- Item 4 is available as D-3153-110.
- Item 5 is available as D-3153-111.
- Item 6 is available as kit DMPR-KC300.
- Item 7 is available as kit DMPR-KC050.
- Items 8 and 9 are available as kit DMPR-KC054.

Tools Required

- screwdriver, 6 inch shank with 5/16 inch blade
- wrench, adjustable to 1 inch
- drill bit (3/16 inch, 1/4 inch, No. 9 or 10) and drill
- hammer
- nut driver, 5/16 inch
- center punch
- hole saw (optional)

General

The D-3153 Pneumatic Actuator is a multipurpose positioning device used primarily for operating ventilating dampers in response to the output signals of a pneumatic controller or electro-pneumatic transducer.

The D-3153 is also rated for use on life safety dampers up to 250°F. All models are UL Component Recognized.

All models incorporate several internal and external features that add functional flexibility:

- A 2-way swivel connection on the actuator cylinder provides non-binding movement to compensate for damper alignment conditions.
- All actuators have a telescoping piston rod for easy linkage to the damper, for attachment points up to 8-3/4 inches away from the face of the actuator.
- A swivel ball joint and slotted crank arm connector are furnished for optional methods of linkage to the damper.
- A stop-screw kit is available for special applications to limit the power stroke of the actuator when required.

The universal mounting bracket is used for damper positioning in two types of mountings:

- duct or wall mounting for both Power Fail Open and Power Fail Closed applications.
- inside frame mounting for both Power Fail Open and Power Fail Closed applications.

Field repairs must not be made. For a replacement D-3153 body, contact the nearest Johnson Controls representative.

Table 2: Single-Drive Location

Panel Height, inches	Blade
24 or less	No. 1 or 3
Greater than 24 but less than 48	No. 3 or 5
Greater than 48	No. 5 or 7

Table 3: Multiple-Drive Location

Panel Height, inches	Blade
30 or less	Nos. 3 and 5
Greater than 30 but less than 48	Nos. 3 and 7
Greater than 48	Nos. 3 and 9

The actuator mounting should be made to the linkage side of the preferred driving blade, which is identified by a blue label. If the labeled driving blade is not available, locate the blade pin to be extended from Table 2 or Table 3. Opposed operation will always use odd-numbered blades.

All illustrations and instructions used in this document cover the attachment of a D-3153 actuator to a Johnson Controls damper utilizing a universal mounting bracket.

A 1/8 inch NPT straight, barbed fitting for 5/32 or 1/4 inch O.D. polytubing is furnished for standard HVAC installation. When used for life safety applications, the straight, barbed fitting will have to be replaced by compression fitting F-200-3 for 1/4 inch O.D. copper tubing, which is ordered separately. Use a pipe-thread sealant on the compression fitting during installation.

Outside Duct Mounting

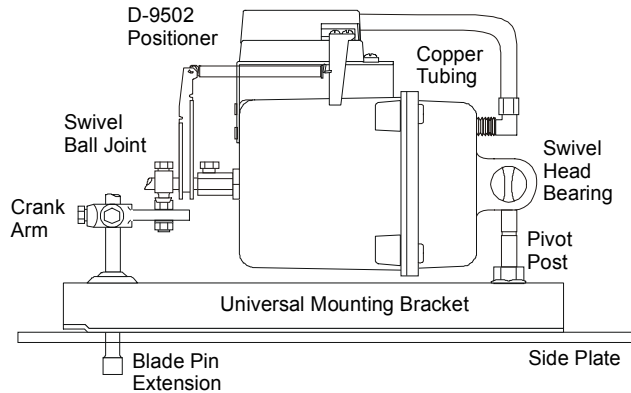


Figure 2: Duct Mounting Components (Copper Tubing Required for Life Safety Dampers)

Blade Pin Extension

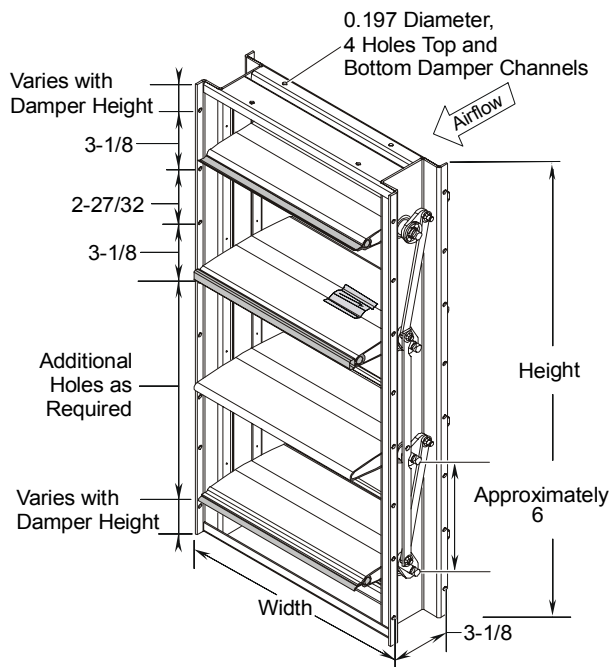


Figure 3: CD-1300 Mounting Holes, inches

1. Locate the labeled preferred driving blade. If the labeled driving blade is not available, locate the blade pin to be extended from Table 2 or Table 3. Opposed operation will always use odd-numbered blades.

Note: It is preferable to use a drive blade near the center of the panel height to distribute the torque evenly.

2. Cut a 1-1/4 inch hole in the duct at the pin locations determined in Step 1.

Note: If a hole saw is used, be sure that the pilot drill does not damage the blade pin.

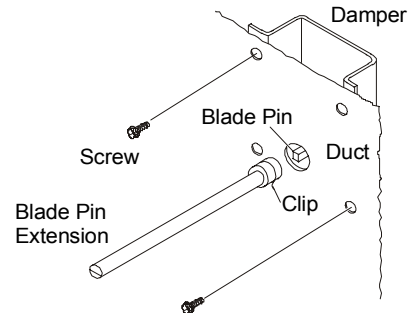


Figure 4: Installing Blade Pin Extension

3. Align the blade pin extension such that the slot indicates the position of the damper blade (vertical is closed and horizontal is open) and then snap the blade pin extension onto the blade pin. The blade pin has a groove that allows the clip to lock in place.

Universal Mounting Bracket

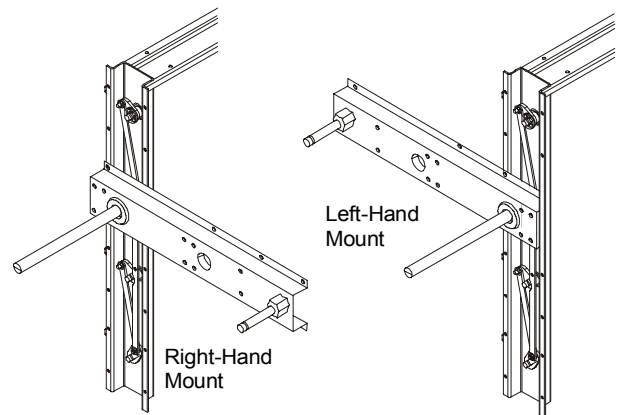


Figure 5: Bracket Positions (Duct Not Shown)

1. Slide the universal mounting bracket over the blade pin extension and position it as it will be mounted. Mark the position of the four mounting holes and remove the universal mounting bracket.
2. Using a 3/16 inch drill bit, drill four holes in the duct to align with the mounting holes in the damper frame as marked.
3. Slide the universal mounting bracket onto the blade pin extension and secure it to the damper frame using four No. 12-24 x 1/2 inch thread-forming, hex-head screws.

Note: If it is not possible to secure the universal mounting bracket to the damper frame as shown, it may be secured to the duct by using four No. 12 x 1 inch type AB sheet metal screws at the slots provided in the bracket.

Table 4: Crank Arm Position

Damper Application	Actuator Mount	Direction to Open	Crank Arm Position
Power Fail Open	Right Side	CW	45°
		CCW	135°
	Left Side	CW	225°
		CCW	315°
	Above	CW	315°
		CCW	45°
Below	CW	135°	
	CCW	225°	
Power Fail Closed	Right Side	CW	135°
		CCW	45°
	Left Side	CW	315°
		CCW	225°
	Above	CW	45°
		CCW	315°
	Below	CW	225°
		CCW	135°

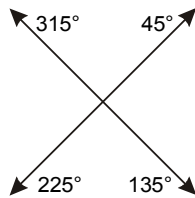


Figure 6: Crank Arm Positions

- Determine damper shaft rotation, Clockwise (CW) or Counterclockwise (CCW). Position the crank arm as shown in Table 4.

Note: The D-3153 is factory assembled for proper linkage length with a 2-1/8 inch crank arm radius for 90° rotation.

- Align the actuator axis in a level position parallel to the bracket before tightening the set screws of the crank arm.
- If further adjustments are required, the piston rod may be telescoped by loosening the set screw on the shaft extension hex nut.
- Make sure that all linkage fasteners are secure before making air line connections.

IMPORTANT: For safety dampers, copper tubing must be used between the actuator and the controller. The tubing must be looped at the actuator so that pivoting of the actuator does not cause stress on the tubing.

Inside Frame Mounting

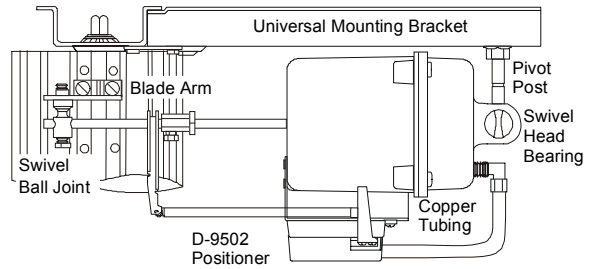


Figure 7: Frame Mounting Components (Power Fail Closed)

Note: To inside frame mount a D-3153 actuator for a Power Fail Open application, a damper with a minimum of three blades is required, and the pivot post has to be moved.

Power Fail Closed application does not require moving the pivot post.

Moving Pivot Post

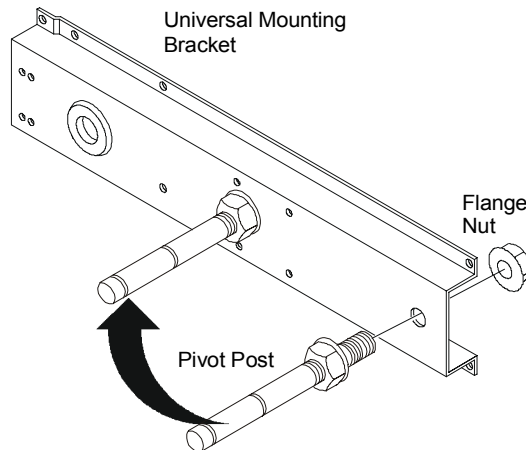


Figure 8: Moving Pivot Post

- Remove the nut securing the pivot post from the universal mounting bracket channel.

2. Move the pivot post from the factory-assembled hole at the end and mount it to the similar hole in the middle of the universal mounting bracket, as shown in Figure 8.

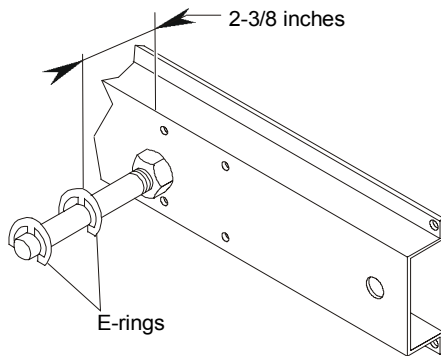


Figure 9: Mounting Distance

3. Verify that the distance from the E-ring in the center groove is approximately 2-3/8 inches from the surface of the universal mounting bracket, as shown in Figure 9.
4. Thread the nut onto the pivot post in the channel of the universal mounting bracket and tighten.

Universal Mounting Bracket

Note: All illustrations show a standard right-hand linkage installation.

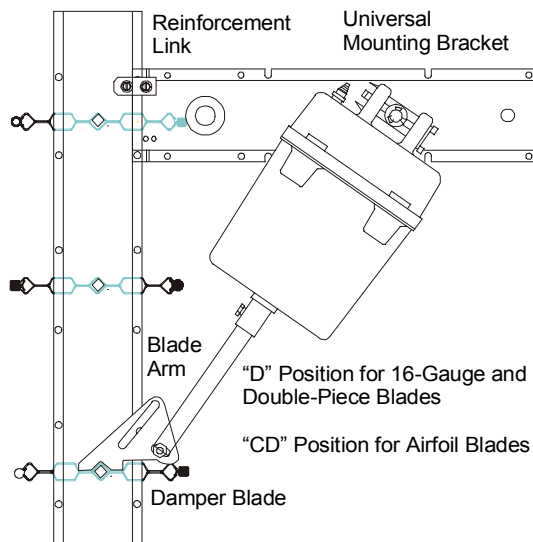


Figure 10: Actuator/Linkage Position for Power Fail Open Operation

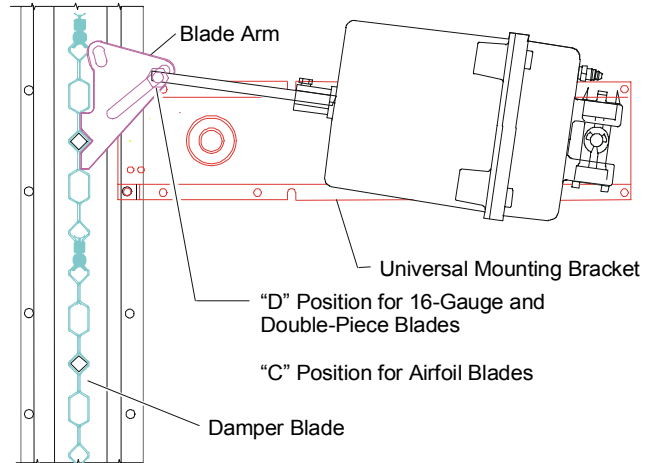


Figure 11: Actuator/Linkage Position for Power Fail Closed Operation

1. Install the universal mounting bracket to the inside of the damper frame using the two holes next to the blade that is two above or two below the preferred driving blade for Power Fail Open (Figure 10), and next to the preferred drive blade for Power Fail Closed (Figure 11).

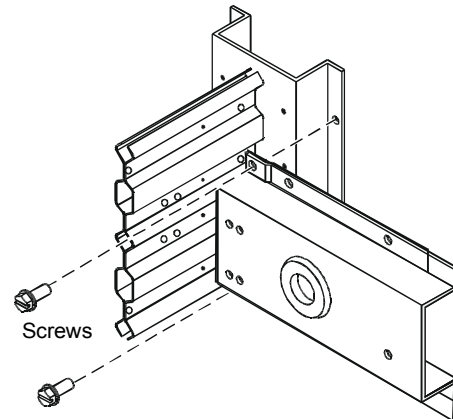


Figure 12: Installing Universal Mounting Bracket

2. Secure by using two No. 12-24 x 1/2 inch thread-forming, hex-head screws, as shown in Figure 12.

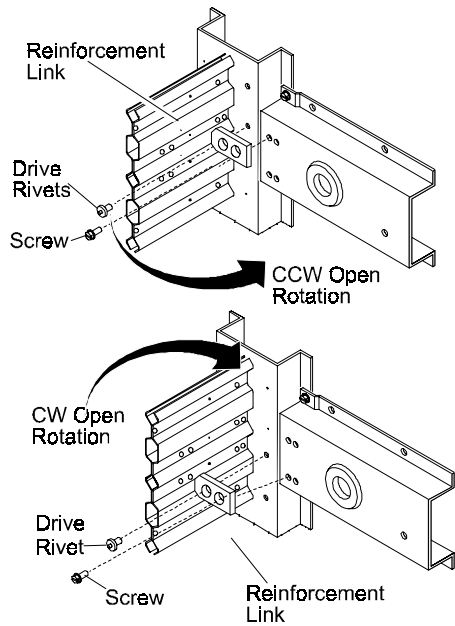


Figure 13: Installing Reinforcement Link

3. Install the reinforcement link to the universal mounting bracket with one thread-forming, hex-head screw, as shown in Figure 13. Do not tighten.
 - For right-hand, CCW-open dampers, position the link above the blade centerline, 1-1/8 inch (28.6 mm) from the blade edge.
 - For right-hand, CW-open dampers, position the link below the blade centerline, 1-3/4 inch (44.4 mm) from the blade edge.
4. Rotate the damper blades to their full open position. Make sure that the reinforcement link does not interfere with blade rotation and mark the position of the hole for the drive rivet.
5. With the blades closed and the reinforcement link out of the way, use a hammer and center punch to provide a drill guide.
6. Using a 1/4 inch (or equivalent) bit, drill one hole for the reinforcement link at the drill guide just made.
7. Reposition the reinforcement link and insert the drive rivet, as shown in Figure 13.
8. Hammer the pin in the rivets flush with the rivet head to secure the link to the frame.
9. Fasten the universal mounting bracket to the side of the duct using No. 12 x 1 inch type AB pan-head screws.

Note: With coupled dampers, two mounting brackets/actuators may be mounted back-to-back for optimum rigidity.

Installing Blade Arm

1. Using a 3/16 inch (or equivalent) bit, drill two holes for the blade arm. For best results:

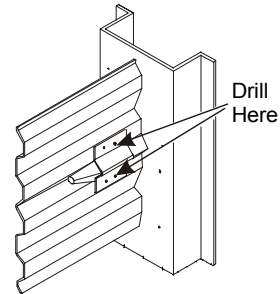


Figure 14: 16-Gauge Blades

- 16-gauge Blades--Drill out the first punch marks from the end channel, as shown in Figure 14.

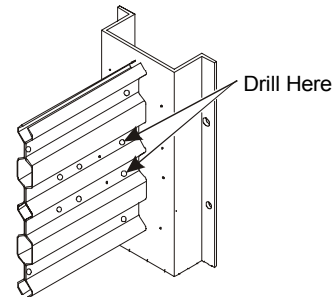


Figure 15: Double-Piece Blades

- Double-piece Blades--Drill out the second set of nugsgets from the end channel, as shown in Figure 15.

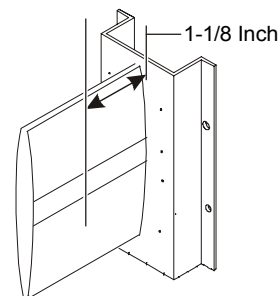


Figure 16: Airfoil Blades

- Airfoil Blades--Measure 1-1/8 inches from the end channel, as shown in Figure 16, and drill on the lines etched in the blade.
2. Secure the blade arm to the preferred driving blade. Refer to Table 2 or Table 3 for drive blade position. Refer to Figures 17 through 24 for applications.

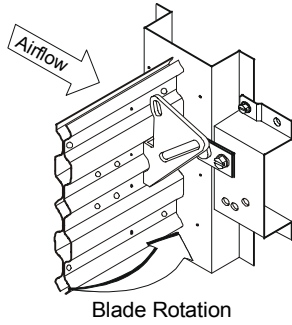


Figure 17: Power Fail Closed with Actuator Mounted Downstream on Right Side of Damper

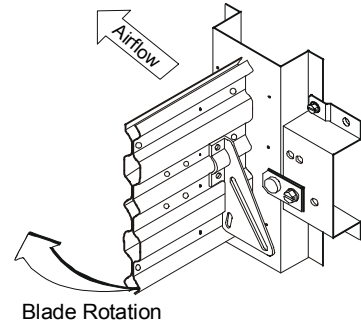


Figure 21: Power Fail Closed with Actuator Mounted Upstream on Right Side of Damper

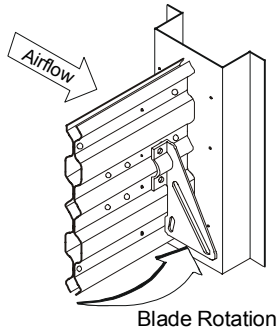


Figure 18: Power Fail Open with Actuator Mounted Downstream on Right Side of Damper

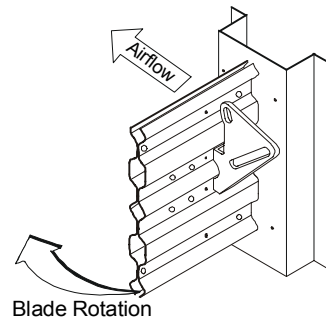


Figure 22: Power Fail Open with Actuator Mounted Upstream on Right Side of Damper

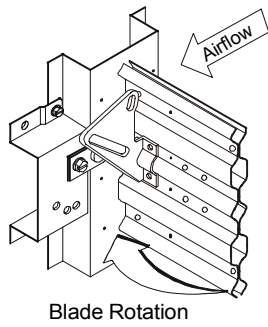


Figure 19: Power Fail Closed with Actuator Mounted Downstream on Left Side of Damper

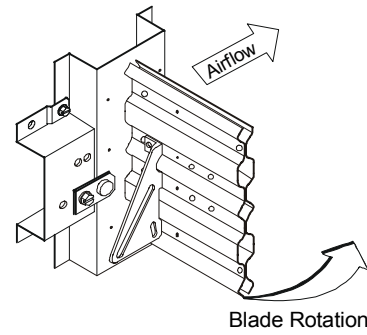


Figure 23: Power Fail Closed with Actuator Mounted Upstream on Left Side of Damper

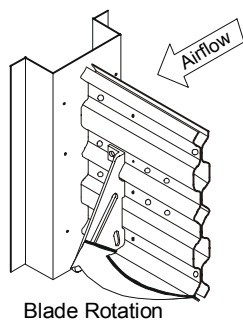


Figure 20: Power Fail Open with Actuator Mounted Downstream on Left Side of Damper

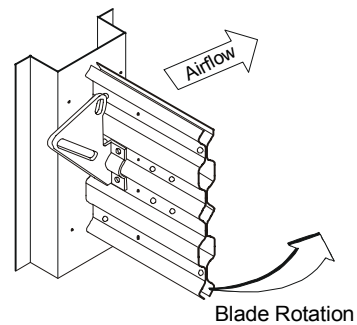


Figure 24: Power Fail Open with Actuator Mounted Upstream on Left Side of Damper

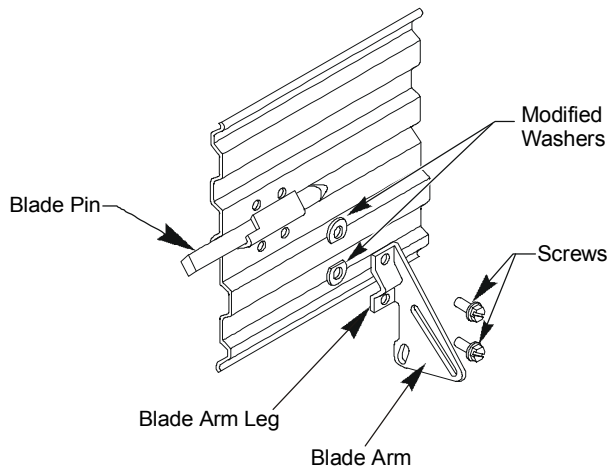


Figure 25: Attaching to 16-Gauge Blades

- 16-gauge Blades--Use two the No. 12-24 x 1/2 inch thread-forming, hex-head screws and modified washers.
- Double-piece Blades--Use the two No. 12-24 x 1/2 inch thread-forming, hex-head screws.
- Airfoil Blades--Use the two No. 10-32 x 1 inch thread-forming, hex-head screws and two No. 10-32 hex nuts.

Actuator Installation

1. Remove the crank arm from the swivel ball joint and attach the swivel ball joint to the damper blade arm small slot for Power Fail Open application, and the long slot for Power Fail Closed application.
2. Secure the ball joint:
 - at a 2-1/8 inch radius (position "D" marked on the arm). The location of the rod connection should be positioned as shown in Figure 25 for standard value and extended-performance dampers.
 - at "C" position in long slot for normally closed applications, and midway between "C" and "D" in the short slot for normally open application on airfoil blade dampers.

The performance specifications are nominal and conform to acceptable industry standards. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

3. Place the swivel-head bearing onto the pivot post and secure it to the post with an E-ring provided.
4. Loosen the set screw on the shaft (and positioner where applicable).
5. Extend the piston rod and attach the ball joint connector to the blade arm.
6. Fully position the damper blades and tighten all linkage fasteners and set screws.
7. If a positioner is used, adjust the spring arm so that the spring is just taut and will clear the blade when closed.

IMPORTANT: For pneumatically powered safety dampers, copper tubing must be used between the actuator and the controller. The tubing must be looped at the actuator so that pivoting of the actuator does not cause stress on the tubing.

Checkout Procedures

1. Supply air pressure to the actuator and operate the damper for at least three complete cycles.
2. Verify that the damper blades open or close fully.
3. Run the actuator to close the damper. If the blades are not fully closed, adjust the position of the linkage rod.
4. Run the actuator to open the damper. The blades should not rotate more than 90°, or past full open. Adjust the crank arm or blade arm radius by repositioning the ball joint if necessary.
5. Repeat procedures as necessary.



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