

## Application

The VCD-42 is a low leakage damper with extruded aluminium airfoil blades and galvanized steel frame. Smooth profile extruded aluminium airfoil blades insure the lowest resistance to airflow in HVAC systems. The VCD-42 is intended for application in medium to high pressure and velocity systems.

VCD-42 is IECC (International Energy Conservation Code) compliant with a leakage rating of 3 cfm/ft<sup>2</sup> at 1 in. wg (55 cmh/m<sup>2</sup> at .25 kPa) or less.

## Damper Ratings

### Velocity

Up to 6000 fpm (30.5 m/s)

### Pressure

Up to 6 in. wg (1.5 kPa) pressure differential

### Leakage

6 cfm/ft<sup>2</sup> at 4 in. wg (110 cmh/m<sup>2</sup> at 1 kPa)  
3 cfm/ft<sup>2</sup> at 1 in. wg (55 cmh/m<sup>2</sup> at .25 kPa)

### Temperature

-40°F to 250°F (-40°C to 121°C).

## Construction

|                 | Standard                                         | Optional                                      |
|-----------------|--------------------------------------------------|-----------------------------------------------|
| Frame Material  | Galvanized Steel                                 | -                                             |
| Frame Thickness | 16 ga. (1.5 mm)                                  | 12 ga. (2.7 mm) *                             |
| Frame Type      | 5 in. x 1 in. (127mm x 25mm) hat channel         | Single flange, Reversed flange, Double flange |
| Blade Material  | Extruded Aluminium (6063T5)                      | -                                             |
| Blade Type      | Airfoil                                          | -                                             |
| Blade Action    | Opposed                                          | Parallel                                      |
| Linkage         | Plated steel out of airstream, concealed in jamb | 316SS                                         |
| Axle Bearings   | Synthetic (acetal) sleeve                        | 316SS                                         |
| Axle Material   | Plated steel                                     | 316SS                                         |
| Blade Seals     | TPE                                              | Silicone                                      |
| Jamb Seals      | Stainless Steel                                  | -                                             |

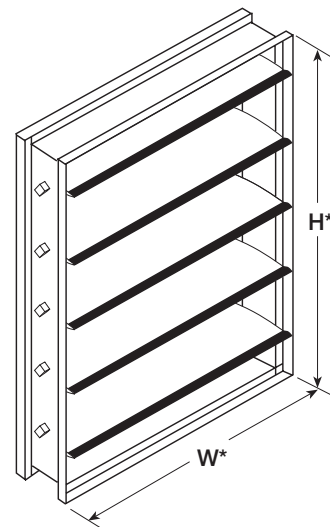
\*When 12 ga. frame is selected and the damper height is less than 17 inches, low profile top and bottom frame members are utilized. These low profile frame members will be made from 16 ga. material.



\*W&H dimension furnished approximately 1/4 in. (6mm) undersize.

## Size Limitations

| W x H  | Minimum Size | Maximum Size   |                  |
|--------|--------------|----------------|------------------|
|        |              | Single Section | Multiple Section |
| Inches | 6 x 6        | 60 x 74        | Unlimited        |
| mm     | 152 x 152    | 1524 x 1880    | Unlimited        |



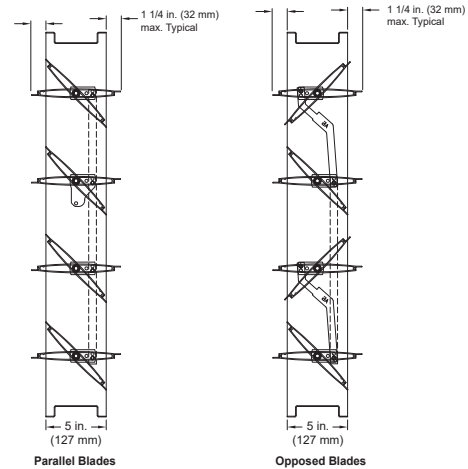
## Notes:

- Low profile head and sill are used on sizes less than 17 in. (432mm) high
- Electric actuator and manual quadrant available. Factory supplied actuators are sized for 1500 fpm (7m/s) and fully closed differential pressure of 2 in. wg (.5 kPa). Contact factory for actuator sizing on applications exceeding those limits.
- In applications where airflow could be uneven, such as a discharge fan, it is imperative to verify that at no point the maximum velocity exceeds the damper's cataloged velocity.
- Blades must be horizontal for either horizontal or vertical mount.

# Blade Operation

**Parallel blade operation** - this configuration requires the damper blades to rotate in the same direction, parallel to one another.

**Opposed blade operation** - adjacent damper blades rotate opposite one another.



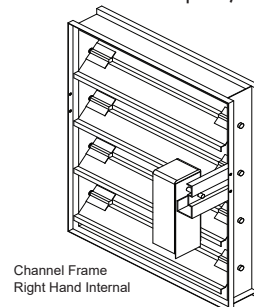
## Options

- Actuators (24V, 120V, manual, pull chain)
- Actuator mounting (external, external kit (field assembly), internal)
- Flanges
- NEMA enclosures (3, 4, 4X, 7)
- Retaining angles
- Transformers

### Frame Options

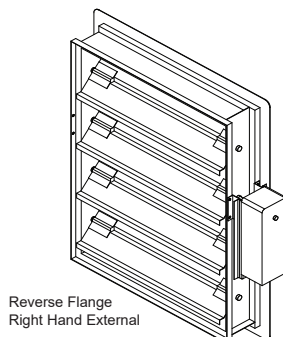
#### Channel Frame

The channel frame option is designed for in-duct or slip-in installation. Dampers with external actuators can be rotated in the field 180 degrees to change from right hand to left hand drive (not recommended on parallel blade dampers).



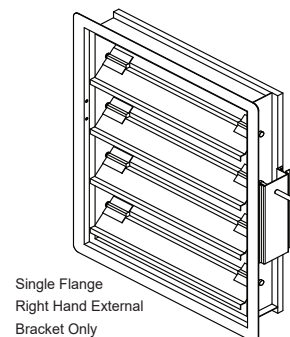
#### Reversed Flange

The reversed flange frame option is designed for “flange to wall/opening” applications. Dampers with external mount actuators must be installed from the interior (cannot be “insert mounted”) to avoid obstructions. Dampers with external actuators can be rotated in the field 180 degrees to change from right hand to left hand drive (not recommended on parallel blade dampers). The flange will be located on the opposite side of the damper frame as the jackshaft/actuator for internal mount actuators.



#### Single Flange

The single flange frame option is designed for “flange to wall/opening” applications. Dampers with external mount actuators must be installed from the interior (cannot be “insert mounted”) to avoid obstructions. Dampers with external actuators can be rotated in the field 180 degrees to change from right hand to left hand drive (not recommended on parallel blade dampers). The flange will be located on the same side of the damper frame as the jackshaft/actuator for internal mount actuators.



## Pressure Drop Data

This pressure drop testing was conducted in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent standard air at a density of 0.075 lb/ft<sup>3</sup> (1.201 kg/m<sup>3</sup>).

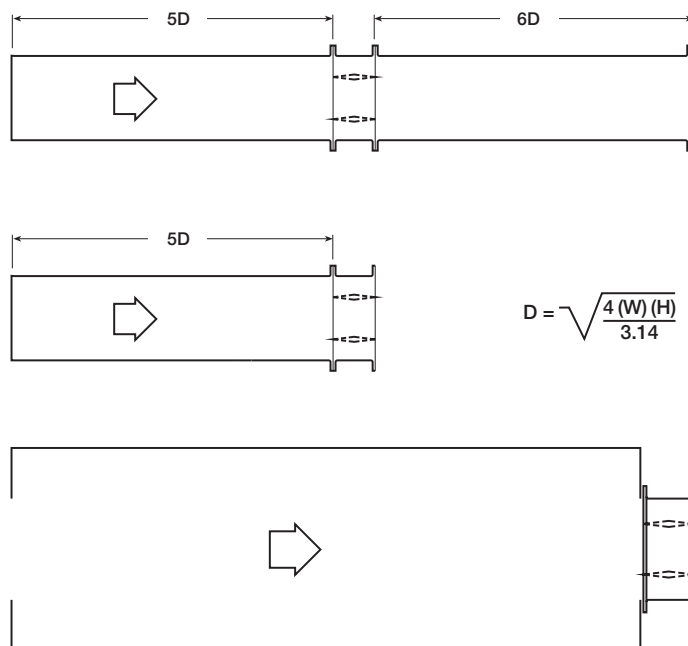
Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

### AMCA Test Figures

**Figure 5.3** Illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

**Figure 5.2** Illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

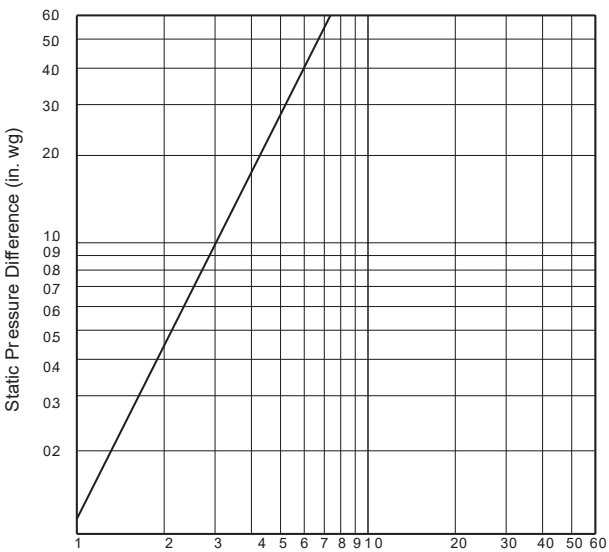
**Figure 5.5** Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.



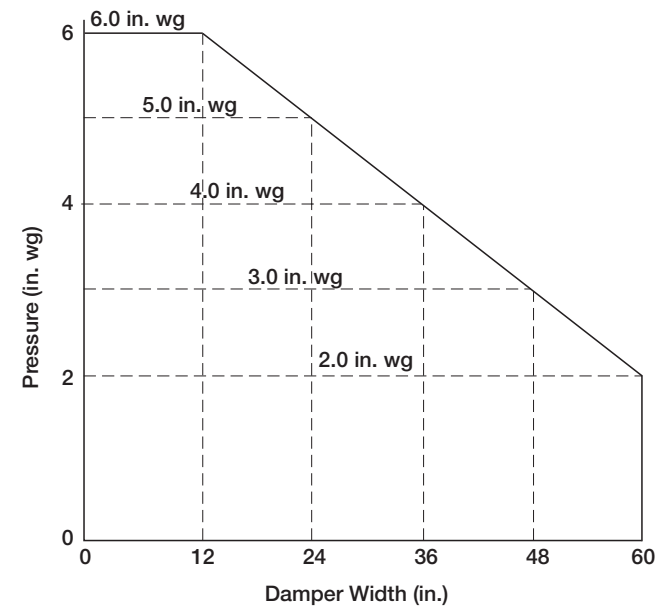
| Dimension<br>inches  | 12x12                |      |      | 24x24 |     |      | 36x36 |     |      | 12x48 |     |      | 48x12 |      |      |
|----------------------|----------------------|------|------|-------|-----|------|-------|-----|------|-------|-----|------|-------|------|------|
| AMCA figure          | 5.2                  | 5.3  | 5.5  | 5.2   | 5.3 | 5.5  | 5.2   | 5.3 | 5.5  | 5.2   | 5.3 | 5.5  | 5.2   | 5.3  | 5.5  |
| Velocity<br>(ft/min) | Pressure Drop in. wg |      |      |       |     |      |       |     |      |       |     |      |       |      |      |
| 500                  | .05                  | .03  | .07  | .01   | .01 | .04  | .01   | .01 | .02  | .01   | .01 | .03  | .03   | .02  | .05  |
| 1000                 | .18                  | .12  | .28  | .05   | .03 | .17  | .04   | .02 | .12  | .01   | .04 | .18  | .11   | .06  | .19  |
| 1500                 | .43                  | .28  | .62  | .12   | .06 | .37  | .09   | .05 | .28  | .14   | .09 | .40  | .25   | .14  | .44  |
| 2000                 | .76                  | .49  | 1.11 | .22   | .11 | .66  | .17   | .08 | .50  | .25   | .16 | .72  | .44   | .25  | .78  |
| 2500                 | 1.19                 | .77  | 1.73 | .34   | .17 | 1.04 | .26   | .13 | .78  | .39   | .25 | 1.12 | .69   | .39  | 1.21 |
| 3000                 | 1.71                 | 1.11 | 2.50 | .49   | .24 | 1.50 | .38   | .19 | 1.13 | .57   | .36 | 1.62 | 1.0   | .57  | 1.75 |
| 3500                 | 2.33                 | 1.51 | 3.41 | .66   | .33 | 2.04 | .51   | .26 | 1.53 | .77   | .49 | 2.21 | 1.36  | .77  | 2.38 |
| 4000                 | 3.04                 | 1.98 | 4.45 | .87   | .43 | 2.66 | .67   | .34 | 2.01 | 1.01  | .64 | 2.88 | 1.78  | 1.01 | 3.11 |

# Leakage

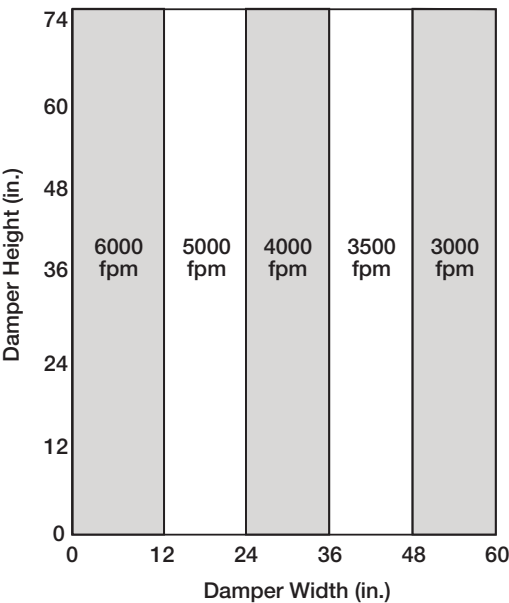
Damper leakage (with blades fully closed) varies based on the type of low leakage seals applied. Model VCD-42 is available with silicone blade seals and stainless steel jamb seals. Leakage testing was conducted in accordance with AMCA Standard 500-D and is expressed as cfm/ft<sup>2</sup> of damper face area. All data has been corrected to represent standard air at a density of 0.075 lb/ft<sup>3</sup> (1.201 kg/m<sup>3</sup>).



## Pressure Limitations



## Velocity Limitations



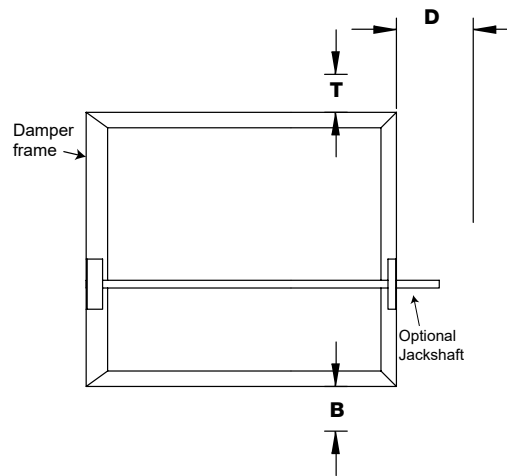
## Temperature Limitations

| Blade Seal | Temperature Range               |
|------------|---------------------------------|
| TPE        | -10°F to 200°F (-23°C to 93°C)  |
| Silicone   | -40°F to 250°F (-40°C to 121°C) |

**NOTE:** VCD-42 will withstand higher pressures and velocities. Displayed ratings are conservative to prevent misapplication. Consult factory if you have an application outside these limitations.

## Space Envelopes

On dampers less than 18 in. (457mm) high, actuators may also require clearances above and/or below the damper frame. "B" and "T" dimensions are worst case clearance requirements for some dampers less than 18 in. (457mm) high. All damper sizes under 18 in. (457mm) high do not require these worst case clearances. If space availability above or below the damper is limited, each damper size should be individually evaluated.



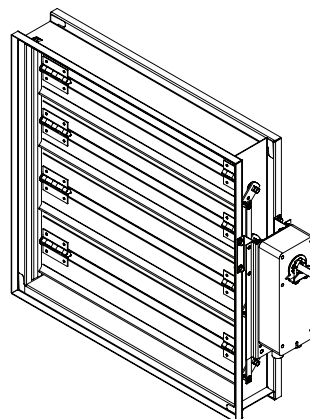
| Actuator Type/Model                                               | Height     | T      | B                              | D                             |
|-------------------------------------------------------------------|------------|--------|--------------------------------|-------------------------------|
|                                                                   | Inches     | Inches |                                |                               |
| AFBUP (-S) and<br>FSNF Series, Belimo<br>MSxx20 Series, Honeywell | ≥6 to <10  | 0      | 12 <sup>3</sup> / <sub>4</sub> | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥10 to <18 | 0      | 2                              | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥18        | 0      | 0                              | 6 <sup>1</sup> / <sub>4</sub> |
| FSLF, LF and TFB Series, Belimo                                   | ≥6 to <10  | 0      | 3 <sup>1</sup> / <sub>2</sub>  | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥10        | 0      | 0                              | 6 <sup>1</sup> / <sub>4</sub> |
| MSxx04 & MSxx09 Series,<br>Honeywell                              | ≥6 to <9   | 0      | 4 <sup>3</sup> / <sub>4</sub>  | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥9         | 0      | 0                              | 6 <sup>1</sup> / <sub>4</sub> |
| MS75xx Series, Honeywell                                          | ≥6 to <10  | 0      | 12 <sup>3</sup> / <sub>4</sub> | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥10 to <18 | 0      | 7                              | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥18        | 0      | 0                              | 6 <sup>1</sup> / <sub>4</sub> |
| GRD and GVD Series, Siemens                                       | ≥6 to <10  | 0      | 12 <sup>3</sup> / <sub>4</sub> | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥10 to <18 | 0      | 2                              | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥18        | 0      | 0                              | 6 <sup>1</sup> / <sub>4</sub> |
| GJD Series, Siemens                                               | ≥6 to <10  | 0      | 3 <sup>1</sup> / <sub>2</sub>  | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥10 to <18 | 0      | 0                              | 6 <sup>1</sup> / <sub>4</sub> |
|                                                                   | ≥18        | 0      | 0                              | 6 <sup>1</sup> / <sub>4</sub> |

## Actuator Mounting

Actuators may be installed at the factory or shipped loose with the necessary linkage and brackets required for mounting. For more detail information on actuator mounting, click on link below or scan QR code.



[ACTUATOR MOUNTING](#)

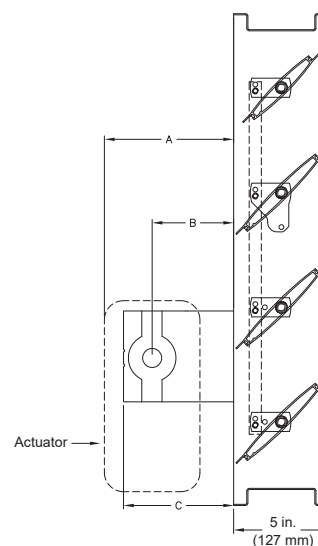


**Non-jackshaft external right**

## Clearance Requirements

This drawing depicts the worse case clearance requirements for an actuator with a jackshaft.

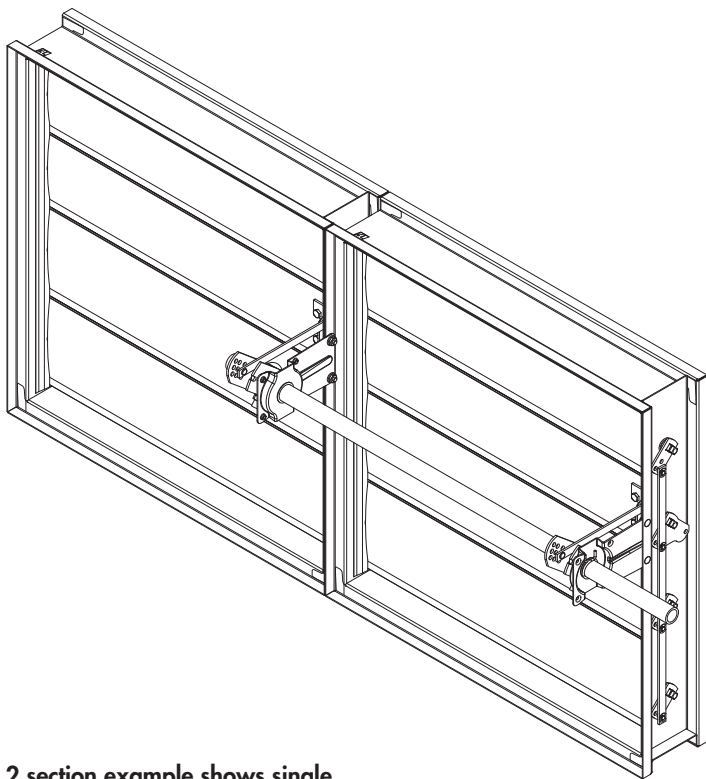
| Internal mount only<br>Actuator model | A                                            | B                                           | C                                              |
|---------------------------------------|----------------------------------------------|---------------------------------------------|------------------------------------------------|
| All except - EFB & EFCX Series        | 7 <sup>3</sup> / <sub>4</sub> in<br>(197 mm) | 3 <sup>3</sup> / <sub>4</sub> in<br>(95 mm) | 5 <sup>3</sup> / <sub>8</sub> in<br>(136.5 mm) |
| EFB & EFCX Series                     | 8 <sup>1</sup> / <sub>2</sub> in<br>(216 mm) | 6 in<br>(152mm)                             | 8 <sup>1</sup> / <sub>2</sub> in<br>(216 mm)   |



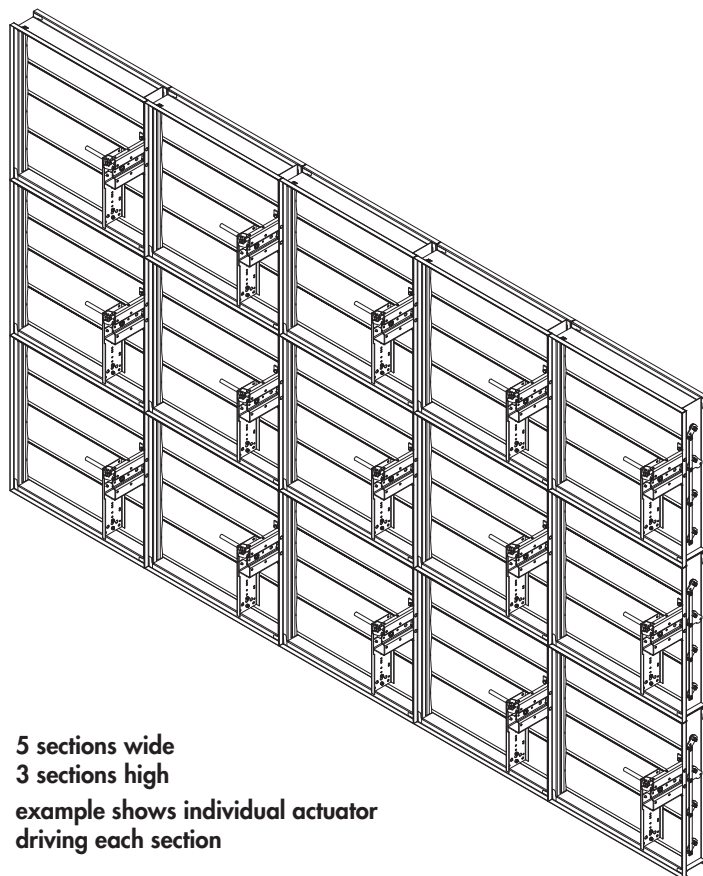
## Multi-Section Dampers

Dampers larger than the maximum single section size, will be made up of a multiple of equal size sections. Multiple section dampers can be jackshafted together so that all sections operate together as shown below.

**Note:** Dampers larger than 60 in. x 74 in. (1524mm x 1880mm) are not intended to be structurally self supporting. Refer to IOM document 483509 for structural support requirements on multi-section assemblies.



2 section example shows single jackshaft driving multiple sections



5 sections wide  
3 sections high  
example shows individual actuator driving each section

## Document Links



[INSTALLATION](#)



[CATALOG](#)



[SELECTION GUIDE](#)



[WARRANTY](#)



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