# VCD-23V

## Low Leakage 3V Control Damper

## Application

The VCD-23V series is a vertical blade low leakage control damper used in buildings to regulate the flow air in an HVAC system. They can be used in intake, exhaust, or mixed air application.

This model is IECC (International Energy Conservation Code) compliant with a leakage rating of 3 cfm/ft$^2$ at 1 in. wg (55 cmh/m$^2$ at .25 kPa) or less.

## Damper Ratings

**Velocity**

Up to 3000 fpm (15.2 m/s)

**Pressure**

Up to 5 in. wg (1.2 kPa) - pressure differential

**Leakage**

Class 1A at 1in. wg (0.25 kPa)
Class 1 up to 5 in. wg (1.2 kPa)

**Temperature**

-40°F to 250°F (-40°C to 121°C). Consult factory for higher temperature

## Construction

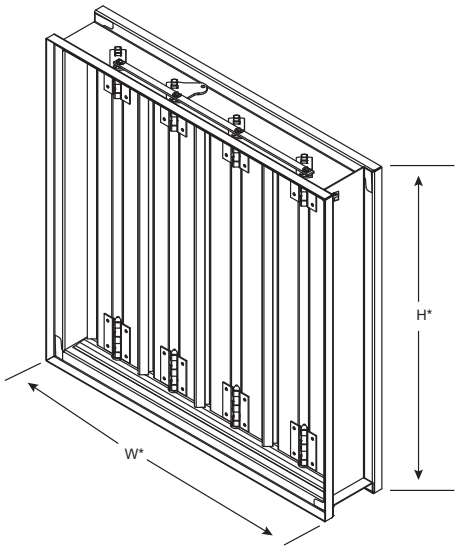
| | Standard | Optional |
|---|---|---|
| **Frame Material** | Galvanized Steel | 304SS |
| **Frame Material Thickness** | 16 ga. (1.5 mm) | 12 ga. (2.7 mm)* |
| **Frame Type** | 5 in. x 1 in. (127mm x 25mm) hat channel | Single flange, Reversed flange, Double flange |
| **Blade Material** | Galvanized steel | 304SS |
| **Blade Type** | 3V | - |
| **Blade Action** | Opposed | Parallel |
| **Blade Seals** | TPE | Silicone |
| **Linkage** | Plated steel out of airstream, concealed in jamb | 316SS |
| **Axle Bearings** | Synthetic with thrush washers | 316SS with thrush washers |
| **Axle Material** | Plated steel | 316SS |
| **Jamb Seal** | 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 ¼ in. (6mm) undersize.

## Size Limitations

| W x H | Minimum Size | Maximum Size | |
|---|---|---|---|
| | | Single Section | Multiple Section |
| **Inches** | 6 x 6 | 74 x 48 | 148 x 96 |
| **mm** | 152 x 152 | 1880 x 1219 | 3759 x 2438 |



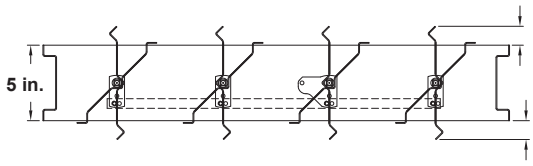

## Notes:

- 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.

# Blade Operation

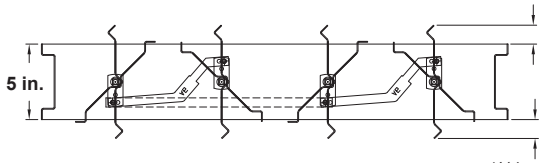
**Parallel blade operation** - this configuration requires the damper blades to rotate in the same direction, parallel to one another.

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




Parallel Blades

1¼ in. (32 mm) max. Typical




1¼ in. (32 mm) max. Typical

Opposed Blades

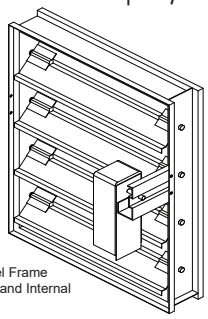
# Options

- Actuators (24V, 120V, manual, pull chain)
- Actuator mounting (external, external kit (field assembly), internal)
- Flanges
- Multi-section fastening
- NEMA enclosures (7)
- OCI (open or closed indicator)
- R Transition
- Retaining angles
- Sleeves
- Transformers

**Frame Options**

## Channel Frame

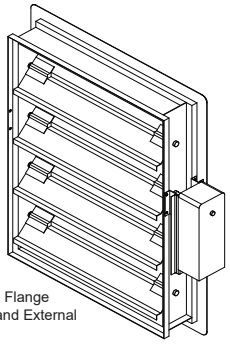
The channel frame option is designed for in-duct or slip-in installation. Dampers with external actuators can be rotated in the field 180 degrees to change from right hand to left hand drive (not recommended on parallel blade dampers).



Channel Frame
Right Hand Internal

## Reversed Flange

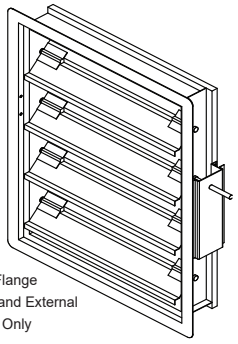
The reversed flange frame option is designed for "flange to wall/opening" applications. Dampers with external mount actuators must be installed from the interior (cannot be "insert mounted") to avoid obstructions. Dampers with external actuators can be rotated in the field 180 degrees to change from 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.



Reverse Flange
Right Hand External

## Single Flange

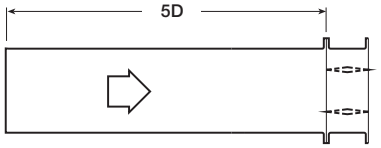
The single flange frame option is designed for "flange to wall/opening" applications. Dampers with external mount actuators must be installed from the interior (cannot be "insert mounted") to avoid obstructions. Dampers with external actuators can be rotated in the field 180 degrees to change from right 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.



Single Flange
Right Hand External
Bracket Only

# AMCA Certified Pressure Drop Data

## AMCA 5.2




12 in. x 12 in. (305mm x 305mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.05 |
| 1500 | 0.11 |
| 2000 | 0.19 |
| 2500 | 0.29 |
| 3000 | 0.41 |
| 3500 | 0.55 |
| 4000 | 0.72 |

24 in. x 24 in. (610mm x 610mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.03 |
| 1500 | 0.06 |
| 2000 | 0.10 |
| 2500 | 0.16 |
| 3000 | 0.23 |
| 3500 | 0.30 |
| 4000 | 0.40 |

36 in. x 36 in. (914mm x 914mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.02 |
| 1500 | 0.05 |
| 2000 | 0.09 |
| 2500 | 0.14 |
| 3000 | 0.19 |
| 3500 | 0.27 |
| 4000 | 0.35 |

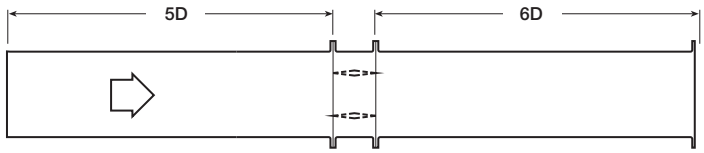
48 in. x 12 in. (1219mm x 305mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.04 |
| 1500 | 0.08 |
| 2000 | 0.15 |
| 2500 | 0.22 |
| 3000 | 0.32 |
| 3500 | 0.43 |
| 4000 | 0.56 |

12 in. x 48 in. (305mm x 1219mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.03 |
| 1500 | 0.07 |
| 2000 | 0.12 |
| 2500 | 0.18 |
| 3000 | 0.26 |
| 3500 | 0.36 |
| 4000 | 0.47 |

## AMCA 5.3




12 in. x 12 in. (305mm x 305mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.03 |
| 1500 | 0.08 |
| 2000 | 0.13 |
| 2500 | 0.20 |
| 3000 | 0.29 |
| 3500 | 0.40 |
| 4000 | 0.51 |

24 in. x 24 in. (610mm x 610mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.02 |
| 1500 | 0.04 |
| 2000 | 0.07 |
| 2500 | 0.11 |
| 3000 | 0.16 |
| 3500 | 0.21 |
| 4000 | 0.28 |

36 in. x 36 in. (914mm x 914mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.02 |
| 1500 | 0.03 |
| 2000 | 0.06 |
| 2500 | 0.09 |
| 3000 | 0.13 |
| 3500 | 0.19 |
| 4000 | 0.25 |

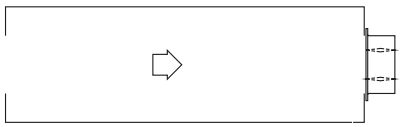
48 in. x 12 in. (1219mm x 305mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.03 |
| 1500 | 0.07 |
| 2000 | 0.12 |
| 2500 | 0.18 |
| 3000 | 0.26 |
| 3500 | 0.36 |
| 4000 | 0.46 |

12 in. x 48 in. (305mm x 1219mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.01 |
| 1000 | 0.03 |
| 1500 | 0.06 |
| 2000 | 0.10 |
| 2500 | 0.16 |
| 3000 | 0.22 |
| 3500 | 0.30 |
| 4000 | 0.39 |

## AMCA 5.5



12 in. x 12 in. (305mm x 305mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.03 |
| 1000 | 0.13 |
| 1500 | 0.30 |
| 2000 | 0.53 |
| 2500 | 0.82 |
| 3000 | 1.19 |
| 3500 | 1.62 |
| 4000 | 2.10 |

24 in. x 24 in. (610mm x 610mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.03 |
| 1000 | 0.12 |
| 1500 | 0.26 |
| 2000 | 0.47 |
| 2500 | 0.75 |
| 3000 | 1.04 |
| 3500 | 1.41 |
| 4000 | 1.90 |

36 in. x 36 in. (914mm x 914mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.03 |
| 1000 | 0.12 |
| 1500 | 0.28 |
| 2000 | 0.50 |
| 2500 | 0.78 |
| 3000 | 1.12 |
| 3500 | 1.53 |
| 4000 | 2.00 |

48 in. x 12 in. (1219mm x 305mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.03 |
| 1000 | 0.14 |
| 1500 | 0.32 |
| 2000 | 0.57 |
| 2500 | 0.90 |
| 3000 | 1.29 |
| 3500 | 1.76 |
| 4000 | 2.30 |

12 in. x 48 in. (305mm x 1219mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|---|---|
| 500 | 0.03 |
| 1000 | 0.12 |
| 1500 | 0.28 |
| 2000 | 0.49 |
| 2500 | 0.77 |
| 3000 | 1.12 |
| 3500 | 1.53 |
| 4000 | 2.01 |

## Leakage Data

Air leakage is based on operation between 32°F (0°C) and 120°F (49°C).
Tested for leakage in accordance with ANSI/AMCA Standard 500-D, Figure 5.5.
Tested for air performance in accordance with ANSI/AMCA Standard 500-D, Figures 5.2, 5.3 and 5.5.

## Torque

Data are based on a torque of 7.0 in. lb./ft² (0.79 N·m) applied to close and seat the damper during the test.

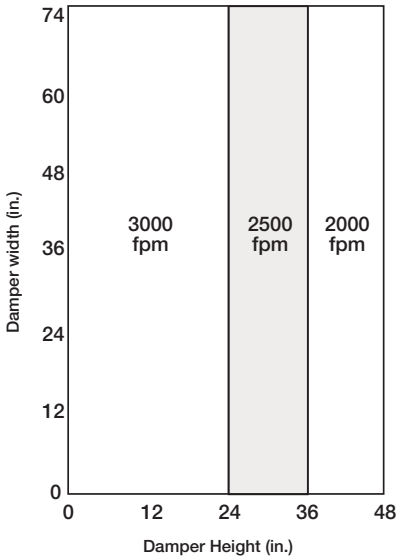
| VCD-23V | Leakage Class* | | |
|---|---|---|---|
| Maximum Damper Width | 1 in. wg (0.25 kPa) | 4 in. wg (1 kPa) | 5 in. wg (1.2 kPa) |
| 48 in. (1219mm) | 1A | 1 | 1 |

***Leakage Class Definitions**

The maximum allowable leakage is defined by AMCA as the following:

- Leakage Class 1A - 3 cfm/ft² at 1 in. wg (class 1A is only defined at 1 in. wg).
- Leakage Class 1
  - 4 cfm/ft² at 1 in. wg
  - 8 cfm/ft² at 4 in. wg
  - 11 cfm/ft² at 8 in. wg
  - 12.6 cfm/ft² at 10 in. wg

## Velocity Limitations

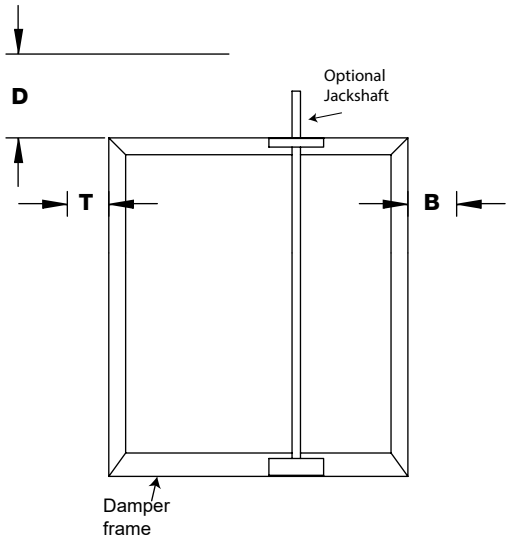



## Temperature Limitations

| 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) |
| No Seal | -40°F to 250°F (-40°C to 121°C) |

## 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.

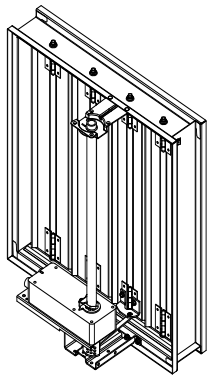



| Actuator Type/Model | Height | T | B | D |
|---|---|---|---|---|
| | Inches | Inches | | |
| **AFBUP (-S) and FSNF Series, Belimo MSxx20 Series, Honeywell** | ≥6 to <10 | 0 | 12¾ | 6¼ |
| | ≥10 to <18 | 0 | 2 | 6¼ |
| | ≥18 | 0 | 0 | 6¼ |
| **FSLF, LF and TFB Series, Belimo** | ≥6 to <10 | 0 | 3½ | 6¼ |
| | ≥10 | 0 | 0 | 6¼ |
| **MSxx04 & MSxx09 Series, Honeywell** | ≥6 to <9 | 0 | 4¾ | 6¼ |
| | ≥9 | 0 | 0 | 6¼ |
| **MS75xx Series, Honeywell** | ≥6 to <10 | 0 | 12¾ | 6¼ |
| | ≥10 to <18 | 0 | 7 | 6¼ |
| | ≥18 | 0 | 0 | 6¼ |
| **GRD and GVD Series, Siemens** | ≥6 to <10 | 0 | 12¾ | 6¼ |
| | ≥10 to <18 | 0 | 2 | 6¼ |
| | ≥18 | 0 | 0 | 6¼ |
| **GJD Series, Siemens** | ≥6 to <10 | 0 | 3½ | 6¼ |
| | ≥10 to <18 | 0 | 0 | 6¼ |
| | ≥18 | 0 | 0 | 6¼ |

## 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

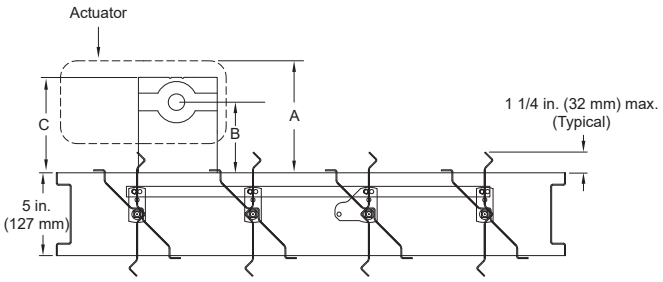


**Jackshafted internal bottom**

## Clearance Requirements

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

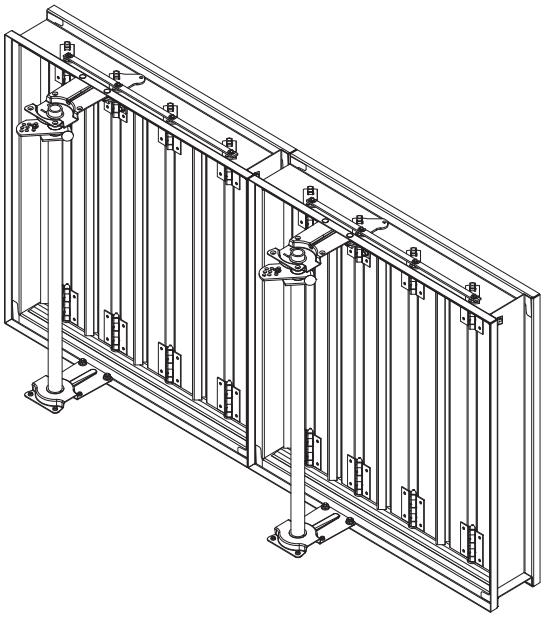
| Internal mount only Actuator model | A | B | C |
|---|---|---|---|
| All except - EFB & EFCX Series | 7 ¾ in (197 mm) | 3 ¾ in (95 mm) | 5 ⅜ in (136.5 mm) |
| EFB & EFCX Series | 8 ½ in (216 mm) | 6 in (152mm) | 8 ½ in (216 mm) |



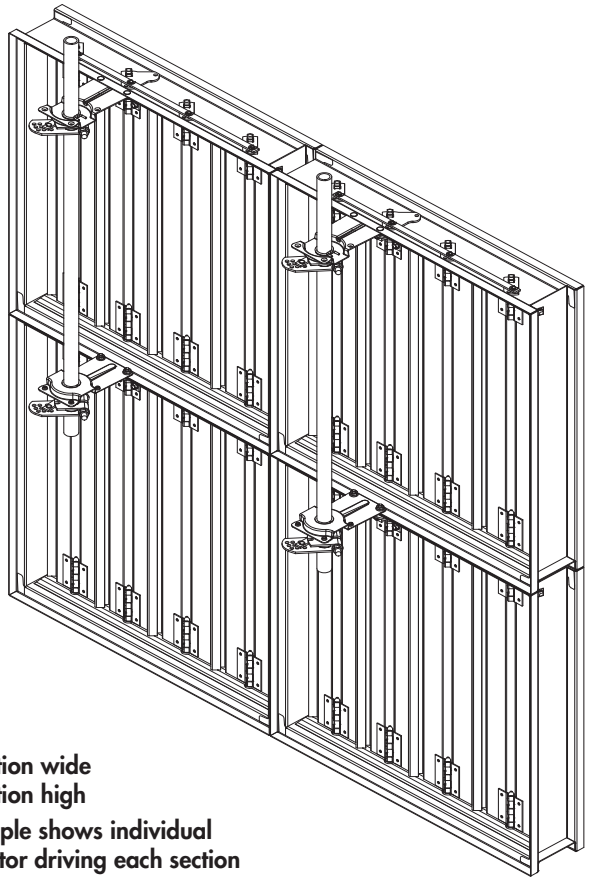
## Multi-Section Dampers

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 74 in. x 48 in. (1880mm x 1219mm) are not intended to be structurally self supporting. Refer to IOM document 483509 for structural support requirements on multi-section assemblies.



**2 section wide example shows single jackshaft driving multiple sections**



**2 section wide**
**2 section high**
**example shows individual actuator driving each section**

## Document Links

INSTALLATION

CATALOG

SELECTION GUIDE

WARRANTY


VCD-23V, R30, September 2025