

Application

The FBV-33 is a vertical style face and bypass low leakage damper with steel airfoil blades. This model is intended for application in medium to high pressure and velocity systems.

The FBV-33 is IECC (International Energy Conservation Code) compliant with a leakage rating of 3 cfm per sq. ft. at 1 in. wg (55cmh/m²) or less.

Vertical style face and bypass control dampers are used in applications where face and bypass dampers are needed one over the top of the other. The units are connected causing one damper to open and the other damper to close.

Ratings

Pressure

Up to 8 in. wg (2 kPa) - pressure differential
For pressures greater than 8 in wg, consult factory.

Velocity

Up to 4,000 fpm (20.3 m/s)

Temperature

Up to 250°F (121°C). Consult factory for higher temperatures

Leakage

Class 1A at 1 in. wg (.25 kPa)
Class 1 at 4-8 in. wg (1 kPa - 2kPa)

Construction

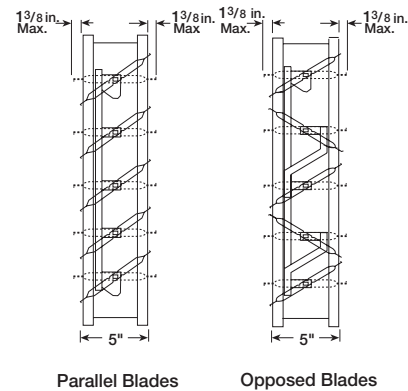
| | Standard | Optional |
|-------------------------|--------------------------------------|--|
| Frame Material | Galvanized steel | - |
| Frame Thickness | 16 ga. (1.5mm) | 12 ga. (2.7mm)* |
| Frame Type | 5 in. x 1 in. Channel (127mm x 25mm) | - |
| Blade Material | Galvanized steel | - |
| Blade Thickness | 14 ga. equivalent (2mm) | - |
| Blade Type | Airfoil | - |
| Blade Action | Parallel | Opposed |
| Bypass Location | Above Face | Below Face |
| Blade Seals | TPE | Silicone |
| Axle Bearings | Synthetic | 316SS |
| Linkage Material | Plated steel | 316SS |
| Axle Material | Plated steel | 316SS |
| Jamb Seal | Stainless steel | - |
| Paint Finishes | None | Baked Enamel, Hi Pro Polyester, Industrial Epoxy |

*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.



Width and Height is based on outside dimension. **Actual sizing only.**

Blade Operation



Size Limitations

| W x H In. (mm) | Damper | |
|-----------------------|--|---------------------------|
| | Face | Bypass |
| Minimum Sizes* | 8 x 6 (203 x 152) | 8 x 6 (203 x 152) |
| Maximum Sizes | Single Section 60 x 74 (1524 x 1880) | 60 x 74 (1524 x 1880) |
| | Multiple Section 120 x 74 (3048 x 1880) | 120 x 74 (3048 x 1880) |

*varies by actuator configuration

Features & Options

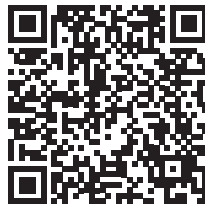
- Low profile head and sill are used on sizes less than 17 in. high (432mm).
- Electric actuators and manual operators available. Factory supplied actuators are sized for 1500 fpm (7 m/s) and a fully-closed differential pressure of 2 in. wg (.5kPa). Contact factory for actuator sizing and applications exceeding those levels.
- Clean wrap available.

Document Links

[Installation Instructions](#)



[Product Catalog](#)



[Damper Warranty](#)

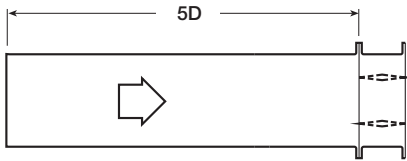


Pressure Drop Data

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 .075 lb/ft³(1.201 kg/m³).

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 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 |

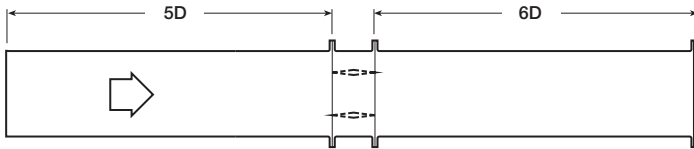
12 in. x 48 in. (305mm x 1219mm)

| 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 |

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 | 0.47 |

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 |

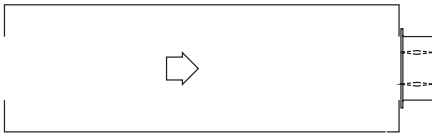
12 in. x 48 in. (305mm x 1219mm)

| 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 | 0.46 |

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

| 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 | 0.02 |
| 1000 | 0.10 |
| 1500 | 0.22 |
| 2000 | 0.40 |
| 2500 | 0.62 |
| 3000 | 0.90 |
| 3500 | 1.23 |
| 4000 | 1.62 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.03 |
| 1000 | 0.12 |
| 1500 | 0.27 |
| 2000 | 0.47 |
| 2500 | 0.75 |
| 3000 | 1.07 |
| 3500 | 1.45 |
| 4000 | 1.91 |

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

| 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 5.0 in. lb./ft² (0.56 N·m) applied to close and seat the damper during the test.

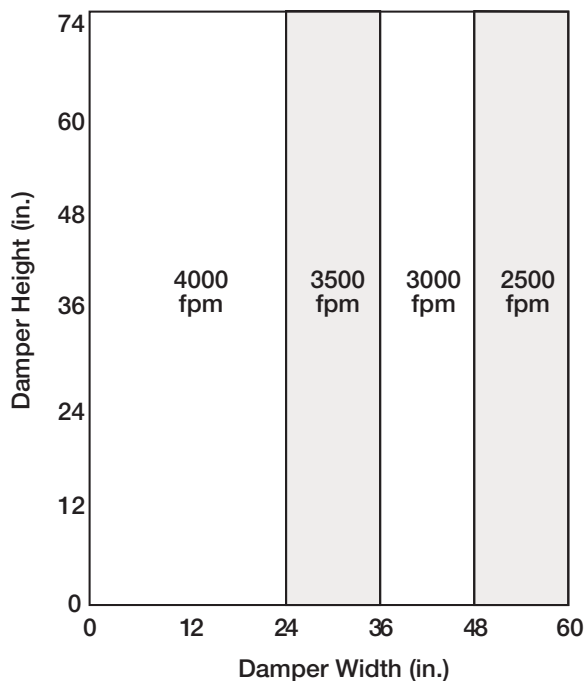
| FBV-33 Maximum Damper Width | Leakage Class* | | |
|-----------------------------------|------------------------|---------------------|---------------------|
| | 1 in. wg (0.25 kPa) | 4 in. wg (1 kPa) | 8 in. wg (2 kPa) |
| 60 in. (1524mm) | 1A | 1 | 1 |

*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

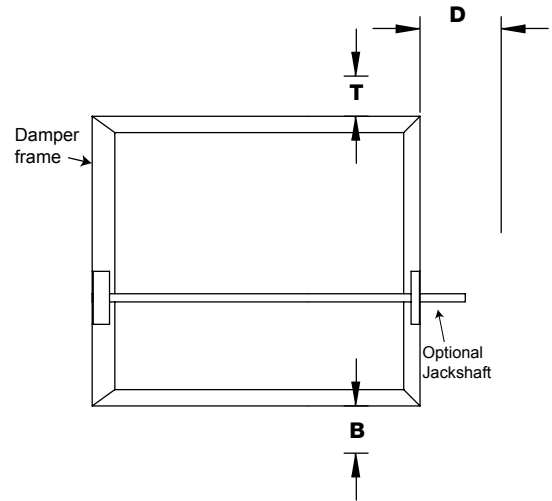
Velocity and Temperature Limitations



| Blade Seal | Temperature Range |
|------------|---------------------------------|
| TPE | -10°F to 180°F (-23°C to 82°C) |
| Silicone | -40°F to 250°F (-40°C to 121°C) |

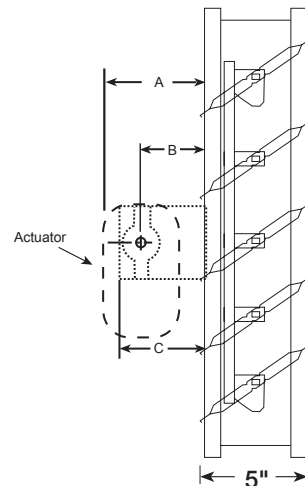
Space Envelopes

Dampers less than 18 in. (457mm) high may require actuator 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.

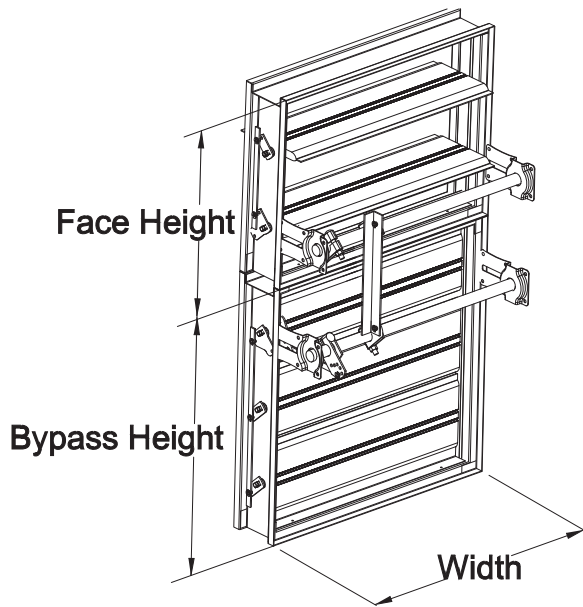


| Actuator Type/Model | Height | T | B | D |
|---|-------------|---|--------|----|
| | Inches (mm) | | | |
| AFBUP (-S) and FSNF Series, Belimo MSxx20 Series, Honeywell | ≥6 to <10 | 0 | 12 3/4 | 6 |
| | ≥10 to <18 | 0 | 2 | 6 |
| | ≥18 | 0 | 0 | 10 |
| FSLF, LF and TFB Series, Belimo | ≥6 to <10 | 0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

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



Assemblies



Width and Height is based on outside dimension. **Actual sizing only.**

Multi-Section Assembly

Dampers larger than the maximum single section size will be made up of a multiple of equal size sections. The bypass damper can be mounted to the right or left of the face damper. This example depicts the face damper is two sections wide and the bypass damper is mounted to the left of the face, which is one section wide.

