



Control & Balancing Dampers



DAMPER > Control Dampers

Applications

Commercial Control Dampers are used in buildings to regulate the flow of air in an HVAC system. They can be used in intake, exhaust, or mixed air applications.

There are two categories of control dampers:

- Balancing
- Commercial Control

Balancing

Manual balancing dampers are control dampers that regulate the flow of air but are not intended to be used in applications as a positive shut-off or for automatic control. These dampers are shipped with manual hand quadrants that can be locked in place.

There are three steel balancing damper models available:

- JNE - S is a single blade
- JNE - M is a multi-blade
- JNE - R is a round blade

There are one aluminum balancing damper models available:

- AD - 25

Remote balancing dampers offer the same function as a manual balancing damper plus the added benefit of controlling the damper remotely at a diffuser or wall plate. These remote balancing dampers are ideal for applications where it is difficult to gain access to manually adjust the dampers to balance airflow.



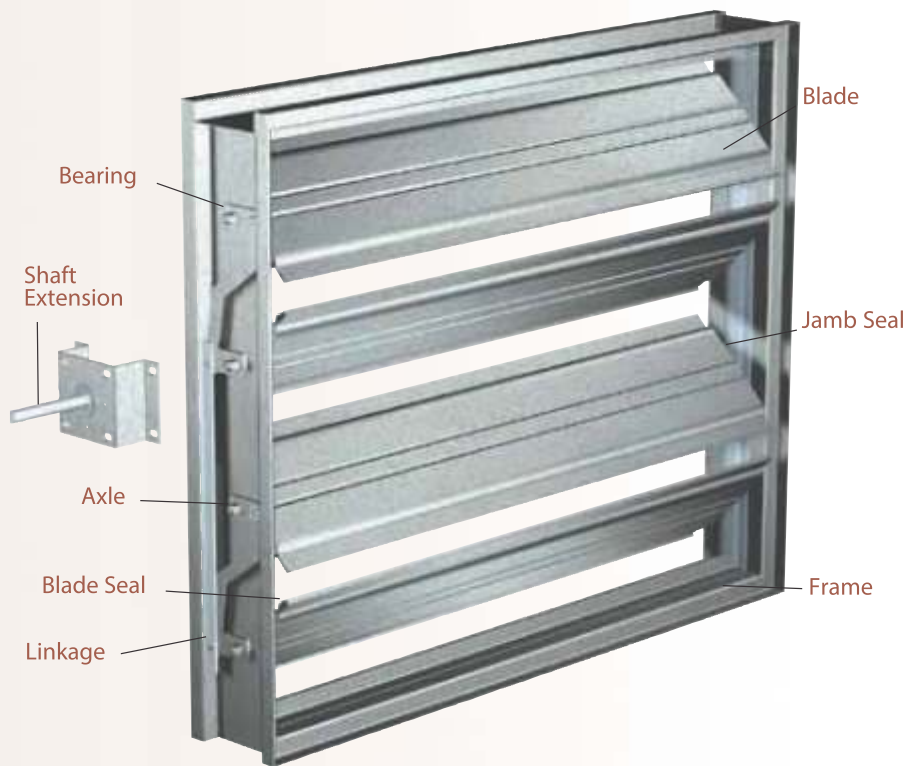
• Jne - S
Single Blade



• Jne - R
Round Blade



• JNE - M
Multi-blade



Manual Quadrant Kit

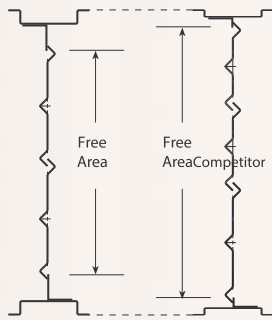
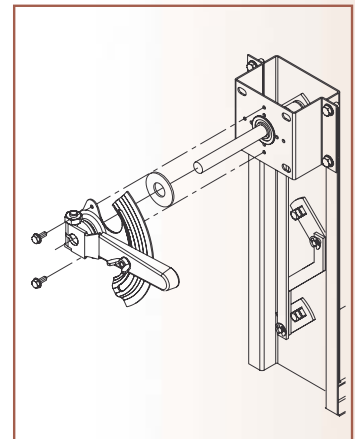


Figure 1

Greenheck with low profile frame

Figure 2

Variable Symmetric Blade Design

Part of **MASTER GRILLE** unique approach to damper construction, Variable Symmetric Blade design (VSB), uses two principles to increase damper performance. First, all damper blades are symmetric about their axis. Second, any combination of 6, 5, 4, and 7 in. (152, 127, 102, and 178mm) blade widths are used in a single damper. These two features are part of **MASTER GRILLE** standard construction and provide the following advantages:

Increases Mounting Flexibility - Symmetrical blades have identical operating characteristics regardless of air flow direction. This allows a **MASTER GRILLE** control damper to be mounted in either direction of flow, an advantage when installing with space constraints.

Increases Free Area - Traditional damper designs with a single blade width require oversized blade stops, limiting free area when the blades are open (Figure 1). Greenheck is able to reduce height or eliminate blade stops, which maximizes free area and increases damper performance (Figure 2).

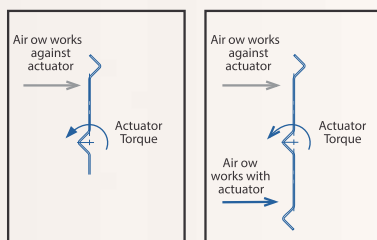


Figure 3

Reduces Actuator Torque - If an unsymmetrical blade closes against air flow, a large amount of torque is needed because the air distribution is unbalanced. **MASTER GRILLE** VSB design balances air flow on each side of a symmetrical blade, reducing the torque required to operate the damper. The use of symmetrical blades allows **MASTER GRILLE** to reduce the size and quantity of actuators used on dampers (Figure 3).



Blades

3V blades are fabricated from a single thickness of 16 ga. (1.5mm) galvanized or stainless steel, incorporating three longitudinal V-Type grooves running the full length of the blade to increase strength. This blade is standard on models JNE - S - JNE - M and JNE - R, designed for low to medium velocity and pressure applications.

Airfoil blades are constructed of double-skin galvanized steel, stainless steel, or heavy-gauge extruded aluminum. This blade design results in lower resistance to airflow and increased strength that is typically used in high pressure systems. Airfoil blades are standard on models JNE - S - JNE - M and JNE - R



3V Blade



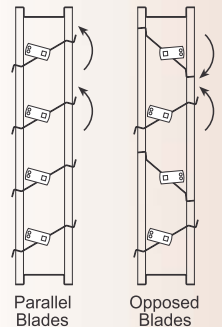
Aluminum Airfoil Blade

Parallel Versus Opposed Blade Operation



control dampers are offered with either parallel or opposed blades. Each style has distinguishing characteristics in regard to the type of operation required.

- **Parallel blade operation** - This configuration requires the damper blades to rotate in the same direction, parallel to one another. Parallel blade orientation is typically used when the damper operates in two positions, open or closed.
- **Opposed blade operation** - Adjacent damper blades rotate opposite one another under opposed blade configuration. Opposed blade configuration is typically used on dampers that modulate airflow.



Frame

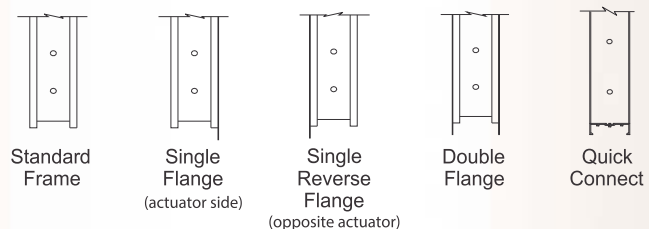


control dampers utilize a 5 in. x 1 in. (127mm x 25mm) hat channel frame made of 16 ga. (1.5mm) steel, 16 ga. (1.5mm) stainless steel, or 0.125 in. (3mm) aluminum. Each frame is built with four separate pieces of material and joined by our Tog-L-Loc® process resulting in the following advantages:

- **Rigid frame** - When two pieces of 16 ga. (1.5mm) steel are joined by the Tog-L-Loc® system, the joint has an equivalent thickness of 10 ga. (3.5mm) steel.
- **Increased corrosion resistance** - High temperatures from welding remove the galvanized finish from damper frames. The Tog-L-Loc® process does not use heat, so damper frames have greater corrosion resistance by retaining the galvanized coating.
- **Optimal free area** - On dampers that are 17 in. (432mm) high or less, MASTER GRILLE uses a low profile top and bottom frame section to maximize free area.
- **Square frame** - Many damper manufacturers construct each frame from a single piece of sheet metal, formed into shape by bending at three corners and spot welding in one. This type of construction can result in a frame that is out-of-square. Symptoms of out-of-square frames include blades that do not close properly and reduced leakage performance. Using four separate frame components (top, bottom, and two sides), MASTER GRILLE Tog-L-Loc® process joints. This ensures that each Greenheck damper is square and provides results in four sturdy, 90°

There are five frame options available:

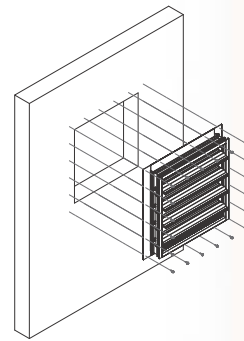
- Channel Frame (standard)
- Single Flange
- Single Reverse Flange
- Double Flange

Tog-L-Loc®
Reinforced Corner



Frame Options

The channel frame style allows a damper to be insert mounted into an opening without being concerned about the linkage sticking out past the frame. The single and single reverse angle frame can be insert mounted or directly mounted to the wall, mating surface or bulkhead. The quick connect frame design is extruded to match up to a TDC, TDF, or Ductmate connection to allow the damper to be cleated to the ductwork.



This illustration depicts how to mount a damper into a plenum wall.

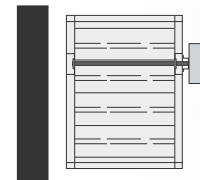
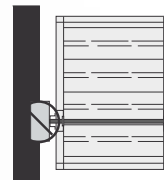
Linkage

Traditional damper linkages are found in the airstream, adding to the pressure drop of the damper blades and frame. **MASTER GRILLE** control dampers have blade linkages concealed in the frame to prevent additional pressure drop and unwanted noise. With standard plated steel construction (stainless steel optional), the linkage is engineered to accurately control each and every blade without need for adjustment.

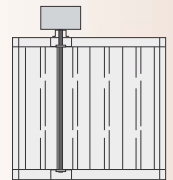


No Top or Bottom

MASTER GRILLE standard control dampers are designed for installation in any position with the blades horizontal. The damper can be turned over so the actuator is on the left or right side. Optional vertical blade models can be turned with the actuator at the top or bottom.



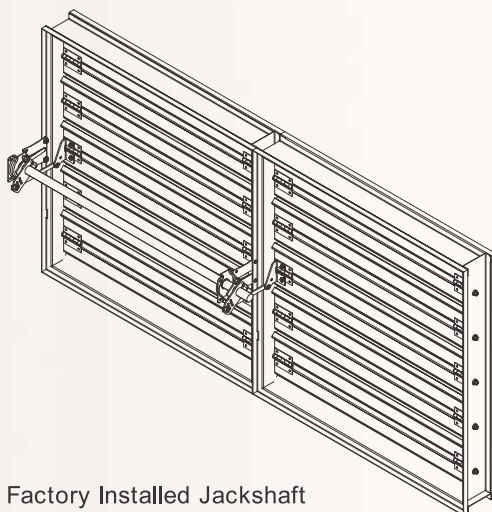
Standard



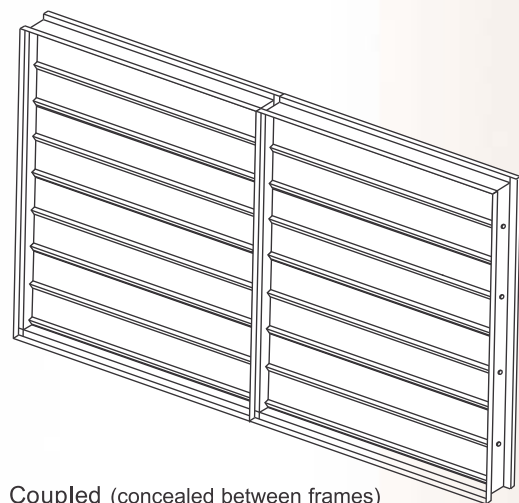
Vertical Blade

Multi-Section Dampers

Each of **MASTER GRILLE** VCD control dampers have a maximum size for a single damper section or panel. These sections vary from 48 in. wide x 60 in. high (1219mm x 1524mm) to 60 in. wide x 74 in. high (1524mm x 1880mm). Dampers larger than a single section will be made up of equal size sections which, depending upon model and size, may be shipped as a single complete assembly or as separate sections for field assembly. Multi-section damper assemblies are supplied with a coupler or factory installed jackshaft so all sections operate together.



Factory Installed Jackshaft



Coupled (concealed between frames)

Damper assemblies (larger than one section) are not designed to be structurally self-supporting. Additional horizontal bracing is recommended for support. Vertical bracing should be installed if required to hold against system pressure.



Options and Accessories Transitions

Paint Finishes

A wide variety of paint finishes are available including:

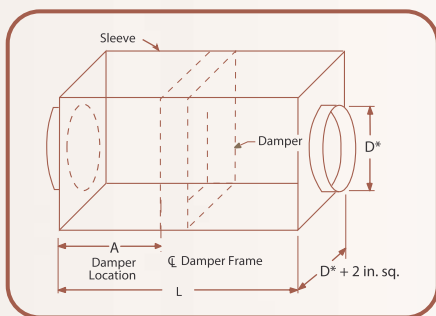
Anodize

Baked Enamel

Epoxy

Hi-Pro Polyester

Industrial Epoxy
Kynar®/Hylar®
Permatector™

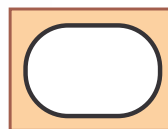


Factory Sleeve Option

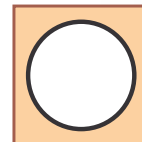
MASTER GRILLE control dampers are available with factory furnished sleeves in lengths up to 48 in. (1219mm). Sleeves are constructed out of 10 through 20 ga. (3.25 through 0.91 mm) galvanized steel. When dampers are installed in factory sleeves, the "A" dimension specifies the location of damper within the sleeve.

Transitions

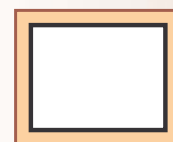
MASTER GRILLE control dampers can be supplied with the appropriate transition option in applications where dampers require installation in round or oval openings. Rectangular dampers are constructed zero, 1 inch (25mm), or 2 inches (51mm) larger than the transition dimensions and installed in a factory sleeve. The sleeve is transitioned at each end to the appropriate round, oval, or rectangular size.



Type O



Type R



Type C

Transition options available



Wide Range of Actuators

 has a wide range of manual, electric, and pneumatic actuators for use with control dampers. Actuators can be installed at the factory or shipped loose with the necessary linkage and brackets required for mounting. Each damper and actuator is cycle tested in our factory before the final product is shipped, ensuring  quality and trouble free operation in the field.

Manual Hand Quadrant

See Figure 5

Location

Internal or External



Figure 5
Manual Quadrant

Electric Actuator Checklist

See Figures 6 & 7

Power Supply

24 VDC, 24 VAC, 120 VAC, and 240 VAC
Frequency

Operation

Spring Return (spring will drive damper to original starting point)
Power Open or Power Closed

Operating Mode

Two-position (damper position is open or closed)
Modulating (damper position determined by modulating control signal)
Floating (damper can be stopped anywhere between open and closed)

Fail Direction (for spring return only)

Open or Closed

Location

Internal or External

Control Signal (for modulating only)

10-0 VDC, 10-2 VDC or 20-4 mAdc

NEMA Enclosure

4, 4, 3, 1X, or 7 (specify one per application)

Accessories

Auxiliary Switches
Transformers

 most commonly used electric actuator manufacturers are Honeywell, Belimo, and Siemens.
Contact your  representative for other options.



Figure 6
Electric
External Mount



Figure 7
Electric
Internal Mount



Pressure Drop Data



- JNE - S , JNE - M
- Galvanized 3V blade
- Blade and jamb seals

Dimension 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 (ft/min)	Pressure Drop in. wg														
500	.01	.01	.03	.01	.01	.03	.01	.01	.02	.01	.01	.03	.01	.01	.03
1000	.05	.03	.13	.03	.02	.12	.02	.02	.10	.04	.03	.12	.03	.03	.12
1500	.11	.08	.30	.06	.04	.26	.05	.03	.22	.08	.07	.27	.07	.06	.28
2000	.19	.13	.53	.10	.07	.47	.09	.06	.40	.15	.12	.47	.12	.10	.49
2500	.29	.20	.82	.16	.11	.75	.14	.09	.62	.22	.18	.75	.18	.16	.77
3000	.41	.29	1.19	.23	.16	1.04	.19	.13	.90	.32	.26	1.07	.26	.22	1.12
3500	.55	.40	1.62	.30	.21	1.41	.27	.19	1.23	.43	.36	1.45	.36	.30	1.53
4000	.72	.51	2.10	.40	.28	1.90	.35	.25	1.62	.56	.46	1.91	.47	.39	2.01



- AD-25
- Extruded aluminum airfoil blade
- Blades contained within the frame
- Blade and jamb seals

Dimension 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 (ft/min)	Pressure Drop in. wg														
500	.08	.05	.10	.01	.01	.03	.01	.01	.03	.01	.01	.03	.06	.03	.08
1000	.31	.20	.40	.05	.02	.12	.04	.02	.11	.05	.03	.12	.23	.13	.29
1500	.69	.45	.88	.11	.05	.29	.09	.04	.26	.11	.07	.27	.52	.29	.63
2000	1.19	.76	1.54	.19	.10	.52	.16	.07	.46	.20	.12	.49	.91	.51	1.12
2500	1.84	1.19	2.41	.30	.15	.80	.24	.10	.72	.30	.19	.76	1.43	.81	1.76
3000	2.67	1.7	3.45	.43	.22	1.14	.35	.15	1.04	.43	.26	1.11	2.05	1.16	2.52
3500	3.59	2.29	4.75	.58	.3	1.6	.48	.20	1.43	.59	.36	1.53	2.82	1.59	3.40
4000	4.64	2.97	6.09	.76	.40	2.14	.62	.27	1.87	.77	.46	2.00	3.69	2.09	4.52

• JNE - R

- Insert type round single blade
- Blade seals



- Insert type round multi-blade
- Blade seals



Dimension inches	12			24		
AMCA figure	5.2	5.3	5.5	5.2	5.3	5.5
Velocity (ft/min)	Pressure Drop in. wg					
500	.01	.01	.02	.01	.01	.02
1000	.06	.02	.10	.04	.01	.09
1500	.13	.05	.22	.08	.03	.20
2000	.23	.08	.38	.15	.06	.36
2500	.37	.13	.60	.23	.09	.56
3000	.53	.19	.86	.33	.13	.81

Dimension inches	12			24			36		
AMCA figure	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5
Velocity (ft/min)	Pressure Drop in. wg								
500	.04	.03	.05	.03	.02	.04	.05	.05	.06
1000	.15	.11	.19	.13	.10	.15	.19	.20	.25
1500	.33	.25	.42	.29	.21	.33	.42	.44	.57
2000	.59	.45	.75	.51	.38	.59	.75	.79	1.01
2500	.93	.70	1.18	.79	.60	.92	1.18	1.23	1.58

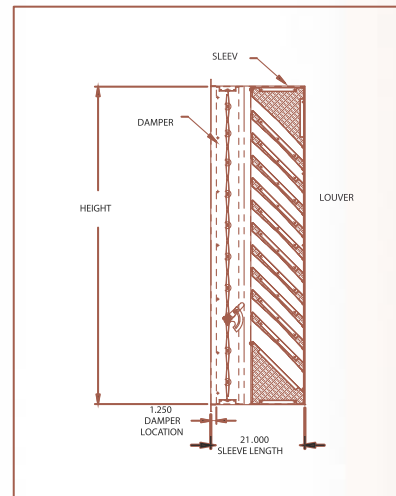


Specialty Control Dampers

Damper/Louver in a Common Sleeve



MASTER GRILLE can provide a damper and louver in a common sleeve for applications requiring single unit assembly. This assembly makes it convenient for installing in the field as one unit instead of dealing with multiple units (consult factory for more information).



Face & Bypass Dampers

The face and bypass dampers are used in applications where two dampers are connected together allowing one damper to open while the other damper closes. The FBH-43 is horizontal style (side-by-side). The FBV43- is vertical style (stacked).

