

Application and Design

Model HCD-530 is a heavy duty flanged frame style industrial control damper with airfoil blades. It is designed to control airflow and provide shut off in HVAC or industrial process control systems. A variety of optional features (see page 3) makes model HCD-530 extremely versatile, allowing its capabilities to be tailored to the application. Available with parallel or opposed blade action.

Ratings (See pages 2 and 3 for specific limitations)

Pressure: 12 - 45 in. w.g. - differential pressure

Velocity: 3500 - 6000 fpm

Temperature: 250° - 400°F (Temperatures over 250°F require special blade end clearance). For higher temperatures consult Greenheck.

Standard Construction

Frame: 10"x2.5" x 10 ga. galvanized steel channel.

Blades: Double skin 12 ga. galvanized steel, symmetrical design with 10" maximum depth.

Axles: Plated steel 1" dia.

Linkage: External heavy duty type with galvanized steel lever arms and tie bars and plated steel pivot pins.

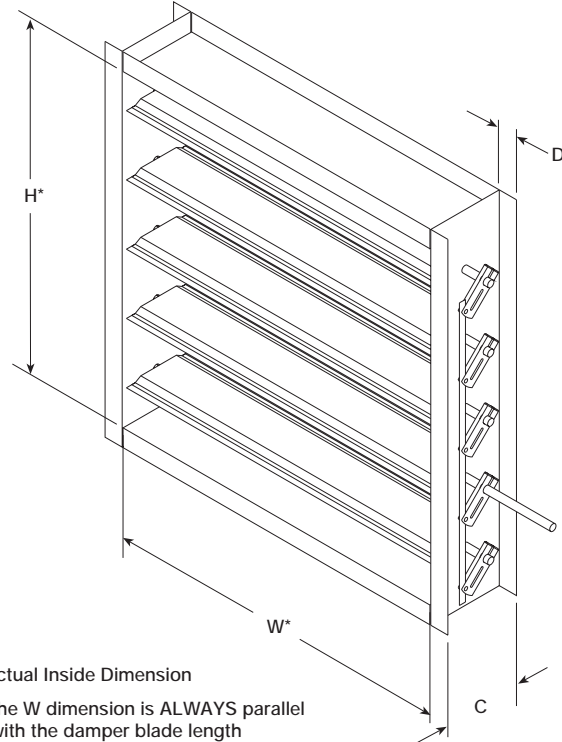
Bearings: External mounted, bronze sleeve with O-ring shaft seal.

Finish: Mill galvanized with high temperature paint touch up.

Size Limitations:

Maximum Size: 72" W x 96" H

Minimum Size: Single blade 6" W x 6" H
 Multiple blades 6" W x 11" H



Frame		Blades		Seals			Axles		Bearings					Bolt Holes in Flanges		
Standard 10 ga. galv. steel		Standard 12 ga. galv. steel		Standard No Seals			Standard Plated Steel 1" dia.		Standard External Mounted Bronze Sleeve					Bolt Holes in Flanges		
10 ga. 304 SS		10 ga. galv. steel		EPDM Blade Seals 250°F max.			Stainless Steel 1" dia.		External Mounted Ball Bearing					Weather Resistant Linkage		
		12 ga. 304 SS		Silicone Rubber Blade Seals 400°F max.			Standard Axle Shaft Seal O-Ring (Clean Air)		Bearings Mounted Outboard of Frame					Blades to Run Vertically**		
		10 ga. 304 SS		Flexible SS Jamb Seals 400°F max.			Axle Shaft Seal Double Gland Stuffing Box									
Quantity	Blade Action		Max. Temp. (if higher than 250°F)	W Width	H Height	Frame Depth C 10" Std.	Flange Width D 2.5" Std.	Bolt Hole information (See pg. 3)								
	PB Parallel	OB Opposed						J	F	L Spacing	M Dia.	U	V	Y		
Project						Location										
Contractor						Design Specifier										

Model HCD-530 Performance Data

Pressure Limitations

The chart at the right shows conservative pressure limitations based on a maximum blade deflection of $w/360$.

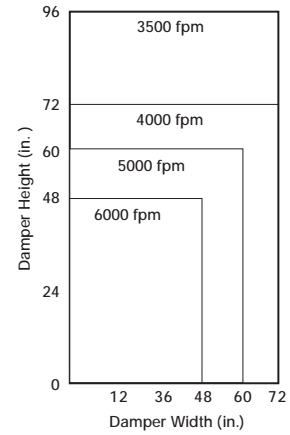
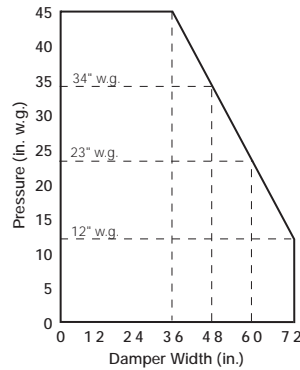
Temperature Limitations

- Blade seals: EPDM -40° to +250°F
Silicone Rubber -40° to +400°F
- Jamb seals: Flexible stainless steel -40° to +400°F

For higher temperatures consult Greenheck

Velocity Limitations

The chart at far right shows conservative velocity limitations based on damper size.



Pressure Drop Data

This pressure drop data was conducted in accordance with AMCA Standard 500 using the three configurations shown. All data has been corrected to represent standard air at a density of .075 lb/ cu. ft.

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 the 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 the high entrance and exit losses due to the sudden changes of area in the system.

AMCA Test Figures

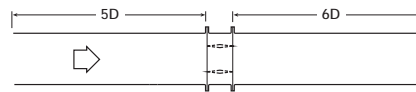


Fig. 5.3

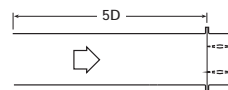


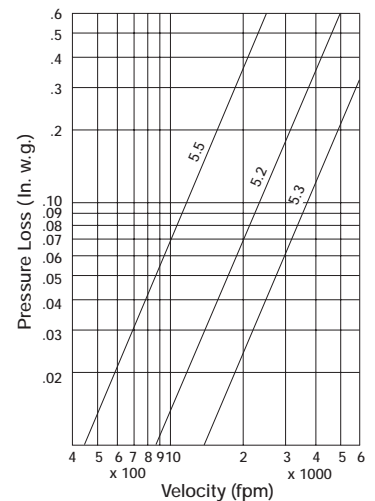
Fig. 5.2



Fig. 5.5

$$D = \sqrt{\frac{4(W)(H)}{3.14}}$$

Pressure Drop 36"x36" Damper



Leakage 36"x36" Damper

Leakage Data

Damper leakage (with blades fully closed) varies based on the type of low leakage seals applied. Model HCD-530 is available with no seals (standard) or with stainless steel jamb seals and EPDM or silicone rubber blade seals. Leakage testing was conducted in accordance with AMCA Standard 500 and is expressed as CFM per sq.ft. of damper face area. All data has been corrected to represent standard air at a density of .075 lb./cu. ft.

Material Options

Frame: Standard - 10 ga. galvanized steel
Optional - 10 ga. 304 stainless steel

Axles: Standard - 1" dia. plated steel
Optional - 1" dia. stainless steel

Blades: Standard - 12 ga. galvanized steel
Optional - 10 ga. galvanized steel
10 & 12 ga. 304 stainless steel

Frame Construction Options

Flange (D Dim.): Standard - 2.5"
Optional - 1 1/2" - 4"

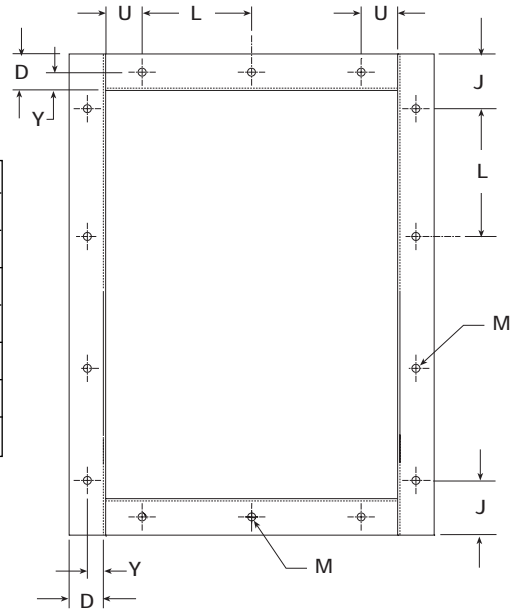
Bolt Holes: Standard - Does not include bolt holes

Optional - Greenheck recommended standard pattern.
7/16" Dia. holes (M dimension) Spaced 6" C-C (L dimension)

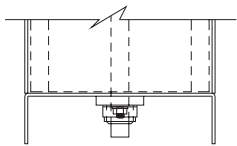
Web (C Dim.): Standard - 10"
Optional - 10" - 12"

Optional - Customer may specify within limits shown in table below.

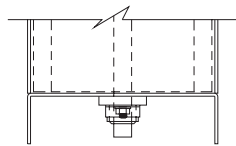
Dim.	Standard	(Min./Max.)	Description
J		(D/2 min.)	First/Last Space in Jamb
F		(1 min.)	No. of Holes in Jamb
L	6"	(2"/12")	Hole Spacing
M	7/16"	(1/4"/ 11/16")	Mounting Hole Diameter
U		(3/4" min.)	First/Last Space in Head/Sill
V		(1 min.)	No. of Holes in Head/Sill
Y	D/2"	(3/4"/ D - 3/4")	Centerline of bolt hole from inside edge of frame



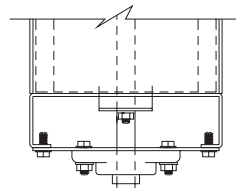
Bearing and Shaft Options



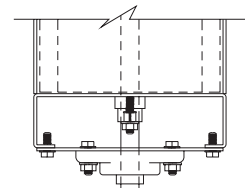
O-Ring Shaft Seal with
External Mounted
Bronze Sleeve Bearing
(Standard)



O-Ring Shaft Seal with
External Mounted Ball
Bearing
(Optional)

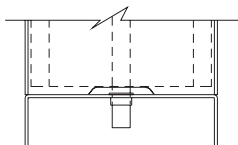


O-Ring Shaft Seal with
Outboard Mounted
Bearing
(Optional)

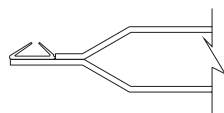


Double Gland Stuffing
Box with Outboard
Mounted Bearing
(Optional)

Blade and Jamb Seal Options



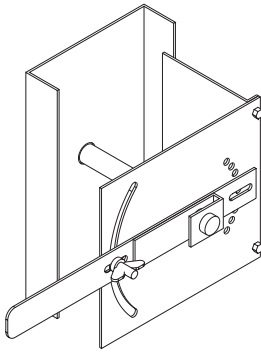
Flexible Stainless
Steel Jamb Seal
(Optional)



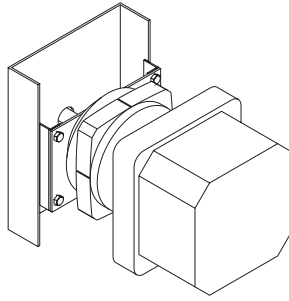
Blade Seal
EPDM (250°F Max)
Silicone Rubber (400°F)
(Optional)

Actuator Options

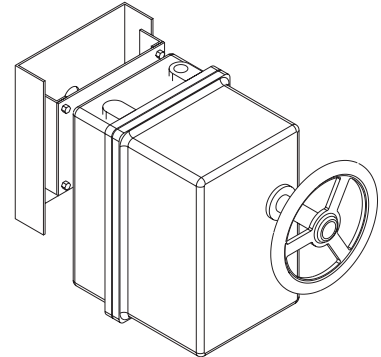
Model HCD-530 can be furnished with many electric and pneumatic actuators mounted and linked by Greenheck. Several of the more popular actuator installations are illustrated.



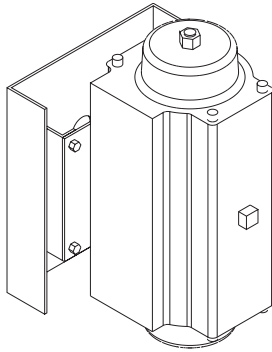
Manual Quadrant



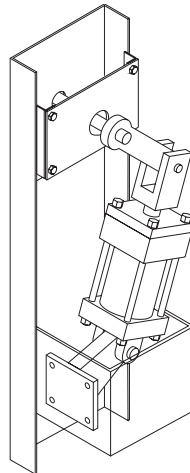
RCS Surepower™



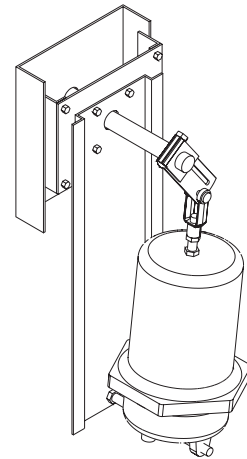
Electric Reversible with
Manual Override



Pneumatic Rack & Pinion



Pneumatic Cylinder
(Double Acting)



Pneumatic Diaphragm

Specifications

Industrial grade control dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described in schedules. Dampers shall consist of: a 10 ga. galvanized steel channel frame with 10" minimum depth and 2.5" flanges; double skin airfoil type blades fabricated from two layers of 12 ga. galvanized steel; 1" dia. plated steel axles turning in externally mounted bronze sleeve bearings; and external (out of the airstream) blade-to-blade linkage. Each blade axle shall be equipped with an O-Ring seal where it penetrates the damper frame to prevent air leakage through the frame. Damper manufacturer's printed application and performance data including pressure, velocity and temperature limitations shall be submitted for approval showing damper suitable for pressures to 45" w.g., velocities to 6000 fpm and temperatures to 400°F. Testing and ratings to be in accordance with AMCA Standard 500. Basis of design is Greenheck model HCD 530.

Specifier may add the following:

Dampers shall be equipped with blade and jamb seals for low leakage performance. Blade seals shall be: *select one of the following* EPDM synthetic rubber for 250°F maximum temperature, *or* Silicone Rubber for 400°F maximum temperature. Jamb seals shall be flexible stainless steel. Damper manufacturer's printed performance data showing standard air leakage less than 4 cfm/sq. ft. @ 1 in. w.g. and less than 8 cfm/sq. ft. @ 4 in. w.g. shall be submitted for approval. Testing and ratings shall be per AMCA Standard 500.