RUSKIN®

CD102 CONTROL DAMPER
OD102 FAN OUTLET DAMPER
Aluminum Airfoil Blades

STANDARD CONSTRUCTION

FRAME
8" x 2" x 12 gage (203 x 51 x 2.8) steel channel.

BLADES
7$\frac{3}{4}$ " (197) wide, .080 (2.1) thick, 6063T5 extruded aluminum airfoil blade.

AXLES
$\frac{3}{4}$ " (19) diameter plated steel.

BEARINGS
CD102 - Stainless steel sleeve pressed into frame.
OD102 - Stainless steel bolted to frame.

LINKAGE
Side linkage out of airstream; 10 gage (3.5) galvanized steel clevis-type arms, $\frac{3}{16}$ " x $\frac{3}{4}$ " (4.8 x 19) plated steel tie bars and $\frac{3}{8}$ " diameter (9.5) stainless steel pivot pins with lock-type retainers.

OPERATING LEVER
Hand Quadrant for manual operation. A crank lever for motor operation is available at no extra cost.

FINISH
Mill galvanized frame with mill finish blades.

MAXIMUM TEMPERATURE
300°F (149°C) maximum.

MINIMUM SIZE
Single blade damper – 6"w x 6"h (152 x 152).
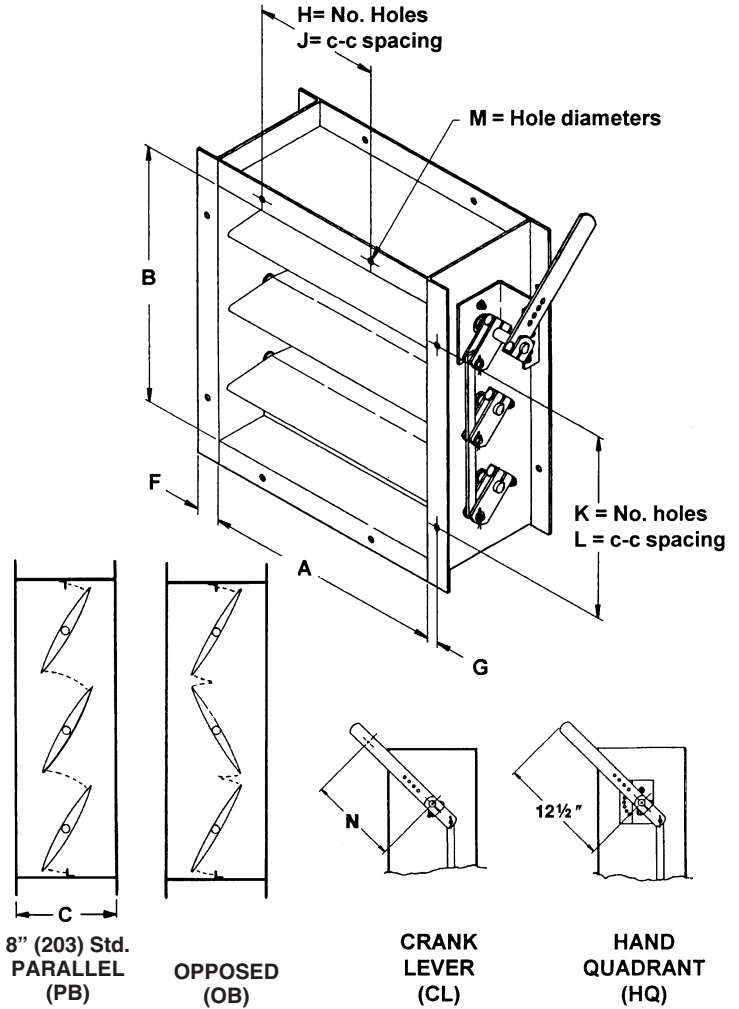Multiple blade damper – 6"w x 14"h (152 x 356).

MAXIMUM SIZE
60"w x 96"h (1524 x 2438).

VARIATIONS

The CD/OD102 can be furnished with a number of variations to meet special requirements. These variations, available at additional cost include:
• 10" (254) deep frame.
• Special finishes.
• Electric and pneumatic actuators.
• Other frame materials.

NOTE: Dimensions in parentheses ( ) indicate millimeters.

8" (203) Std.
PARALLEL (PB)   **OPPOSED (OB)**   **CRANK LEVER (CL)**   **HAND QUADRANT (HQ)**

FRAME		BLADES		AXLES		BEARINGS	LINKAGE	SEALS (OPT)	ACCESSORIES	
8" x 2" x 12 GA (203 x 51 x 2.8) GALVANIZED STEEL		7³/4" (197) WIDE .080" (2.1) THK 6063T5 EXTRUDED ALUMINUM AIRFOIL		3/4" (19) DIA. 'D' PLATED STEEL		SS SLEEVE PRESSED INTO FRAME (STD ON CD102)	SIDE LINKAGE (CONCEALED)	BLADE SEALS SILICONE 400°F (204°C) MAX	HAND QUADRANT (HQ)	
8" x 2" x 10 GA (203 x 51 x 3.5) GALVANIZED STEEL				3/4" (19) DIA. 'D' STAINLESS STEEL (OPT)		SS SLEEVE IN CAST HSG BOLTED TO FRAME (STD ON OD102 OPT ON CD102))		SS JAMB SEALS	CRANK LEVER (CL)	
									BOLT HOLES ONE FLANGE (OPT)	
8" x 2" .125 (203 x 51 x .3.2) ALUMINUM				3/4" (19) DIA. 'D' ALUMINUM (OPT)		BOLT ON BRGS W/INTEGRAL SHAFT SEALS (OPT)			BOLT HOLES BOTH FLANGES (OPT)	
									PNEUMATIC ACTUATOR (OPT)	
									ELECTRIC ACTUATOR (OPT)	
									1¹/2" (38) TO 4" (102) FLANGES (OPT)	

QTY.	BLADE ACTION		DIMENSIONS										LEVER TYPE		COMMENTS	TAG
	PB	OB	A	B	C	F	G	H	J	K	L	M	HQ	CL		

JOB   LOCATION

ARCH./ENGR.   CONTRACTOR

REPRESENTATIVE   DATE

PRESSURE DROP INFORMATION
AREA FACTOR TABLE

B Dimension Height in Inches (mm)	A Dimension—Width in Inches (mm)																		
	6" (152)	9" (229)	12" (305)	15" (381)	18" (457)	21" (533)	24" (610)	27" (686)	30" (762)	33" (838)	36" (914)	39" (991)	42" (1067)	45" (1143)	48" (1219)	51" (1295)	54" (1372)	57" (1448)	60" (1524)
6" (152)	6.65	4.43	3.33	2.66	2.22	1.90	1.66	1.48	1.33	1.21	1.11	1.02	.95	.89	.83	.85	.80	.76	.72
9" (229)	3.93	2.62	1.96	1.57	1.31	1.12	.98	.87	.79	.71	.65	.60	.56	.52	.49	.48	.46	.43	.41
12" (305)	2.75	1.84	1.38	1.10	.92	.79	.69	.61	.55	.50	.46	.42	.39	.37	.34	.34	.33	.31	.29
15" (381)	2.05	1.37	1.02	.82	.68	.59	.51	.46	.41	.37	.34	.32	.29	.23	.26	.25	.24	.23	.21
18" (457)	1.74	1.16	.87	.69	.58	.50	.43	.39	.35	.32	.29	.27	.25	.27	.22	.22	.20	.19	.18
24" (610)	1.27	.85	.63	.51	.42	.36	.32	.28	.25	.23	.21	.20	.18	.17	.16	.16	.15	.14	.13
30" (762)	.96	.64	.48	.39	.32	.28	.24	.21	.19	.18	.16	.15	.14	.13	.12	.12	.11	.11	.10
36" (914)	.80	.53	.40	.32	.27	.23	.20	.18	.16	.15	.13	.12	.11	.11	.10	.10	.09	.09	.08
42" (1067)	.68	.46	.34	.27	.23	.20	.17	.15	.14	.12	.11	.11	.10	.09	.09	.08	.08	.08	.07
48" (1219)	.60	.40	.30	.24	.20	.17	.15	.13	.12	.11	.10	.09	.09	.08	.07	.07	.07	.07	.06
54" (1372)	.53	.35	.26	.21	.18	.15	.13	.12	.11	.10	.09	.08	.08	.07	.07	.07	.06	.06	.06
60" (1524)	.47	.31	.23	.19	.16	.13	.12	.10	.09	.08	.08	.07	.07	.06	.06	.06	.05	.05	.05
66" (1676)	.42	.28	.21	.17	.14	.12	.11	.09	.08	.08	.07	.07	.06	.06	.05	.05	.05	.05	.04
72" (1829)	.39	.26	.19	.16	.13	.11	.10	.09	.08	.07	.06	.06	.06	.05	.05	.05	.04	.04	.04
78" (1981)	.36	.24	.18	.14	.12	.10	.09	.08	.07	.07	.06	.06	.05	.05	.04	.04	.04	.04	.04
84" (2134)	.33	.22	.17	.13	.11	.10	.08	.07	.07	.06	.06	.05	.05	.04	.04	.04	.04	.04	.03
90" (2286)	.31	.21	.16	.12	.10	.09	.08	.07	.06	.06	.05	.05	.04	.04	.04	.04	.04	.03	.03
96" (2438)	.29	.19	.14	.12	.10	.08	.07	.06	.06	.05	.05	.04	.04	.04	.04	.04	.03	.03	.03

DETERMINING PRESSURE DROP

Use the Area Factor Table and Pressure Drop Chart to determine pressure drop through Ruskin CD/OD102 Dampers.

1. Determine area factor for damper by entering the Area Factor Table through duct width and height.
2. Find the conversion velocity (CV) by multiplying the selected size damper's area factor by the flow rate in CFM:

CV = Area Factor x CFM

3. Enter the Pressure Drop Chart at the determined area factor and proceed up to appropriate conversion velocity (CV) line. Then, read across to static pressure drop at left side of chart.

Example:

1. Find the pressure drop across an 18" wide x 18" high Model CD/OD102 Damper handling 8570 CFM. From the Area Factor Table, area factor is determined to be .58.

CFM x AREA FACTOR EQUALS CONVERSION VELOCITY

2. Therefore, CV (Conversion Velocity) = 8570 CFM x .58 = 5000. Using the Pressure Drop Chart, pressure drop = .28 inches water gage.
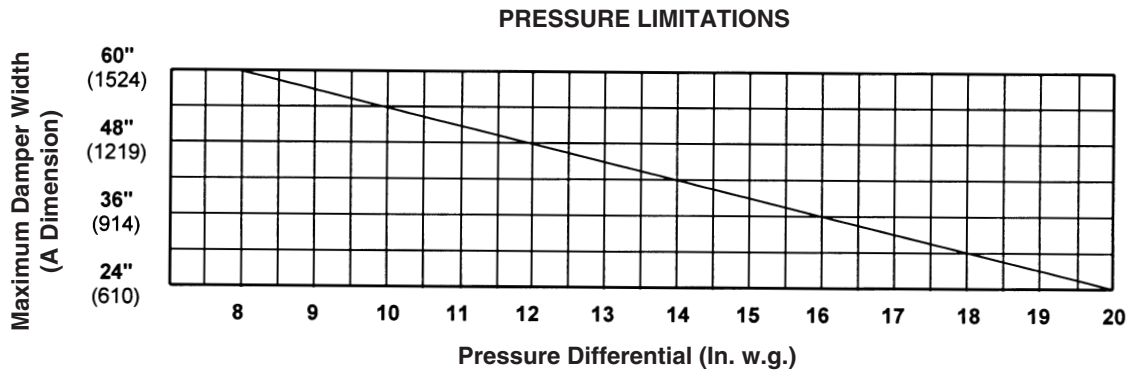
NOTES:

1. Ratings are based on AMCA Standard 500 using Test Setup Apparatus Figure 5.3 (damper is installed with duct upstream and downstream).
2. Static Pressure and Conversion Velocities are corrected to .075 lb./cu. ft. air density.

CD/OD 102 PRESSURE DROP CHART

PRESSURE LIMITATIONS
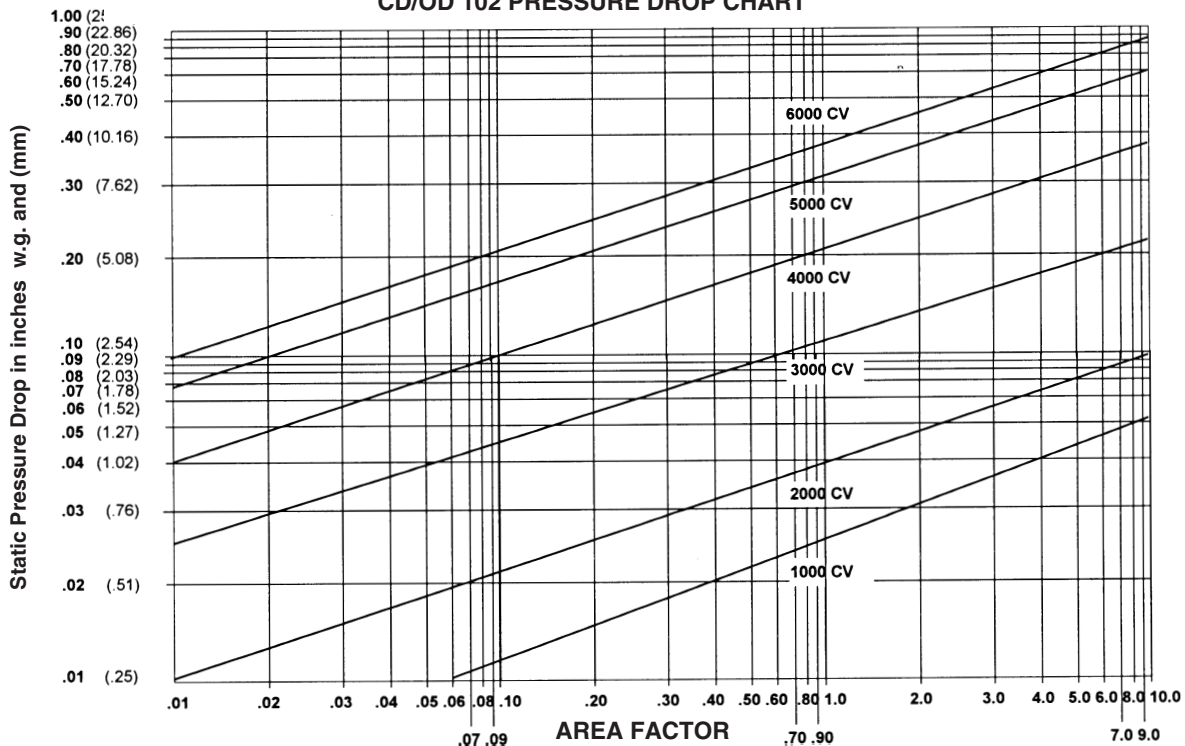
The OD102 damper can be mounted in any position for fan discharge. Ideal for medium to heavy duty commercial or industrial applications, the OD102 can be used to control or modulate the volume of air delivered by the fan, to shut off fan air flow and to balance the system.

The graph shows the maximum allowable pressure differentials across a closed CD/OD102 damper. Dampers with a 60" (1524) width (A dimension) can withstand 8 in. w.g. Dampers with smaller widths (A dimension) can withstand higher pressures. For example, a 48" (1219) A dimension damper can withstand a maximum of 12 in. w.g. and a 36" (914) A dimension damper can withstand a maximum of 16" w.g.

Note that CD/OD102 dampers are not recommended for use in abrasive or high temperature atmospheres due to the aluminum blade construction. Consult your Ruskin representative for a listing of Ruskin models suited to abrasive environments.

TOTAL CFM LEAKAGE AT ONE INCH
WATER GAGE STATIC PRESSURE DIFFERENTIAL
(For Damper Equipped with Optional Seals)

DAMPER WIDTH	DAMPER HEIGHT													
	12" (305)	18" (457)	24" (610)	30" (762)	36" (914)	42" (1067)	48" (1219)	54" (1372)	60" (1524)	66" (1676)	72" (1829)	78" (1981)	84" (2134)	90" (2286)	96" (2438)
12" (305)	15	23	30	38	45	53	60	68	75	83	90	98	105	113	120
24" (610)	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
36" (914)	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
48" (1219)	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256
60" (1524)	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320

LEAKAGE CORRECTION FACTOR

Static Pressure (in.w.g.)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Correction Factor	1.0	1.4	1.7	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.3	3.5	3.6	3.7	3.9	4.0	4.1	4.2	4.4	4.5

DETERMINING LEAKAGE

To determine leakage at static pressure differentials higher than one inch water gage, multiply leakage at one inch (determined from table) by correction factor for higher static pressure (determined from the Leakage Correction Factor Table).

Example:
Find leakage for a 36" wide x 24" high damper at 3 inches water gage: 48 CFM x 1.7 = 81.6 CFM leakage at 3 inches water gage.

Leakage ratings are based on AMCA Standard 500 using Test Setup Apparatus Figure 5.5. Torque applied holding damper closed at 10 in. lbs. per sq. ft. of damper with minimum of 20 in. lbs.

INSTALLATION

For proper operation, damper must be installed square and free from racking. Opposed blade dampers must be operated from a power blade or drive axle.

NOTE:

Dampers are designed for operation with blades running horizontally. Dampers to be installed with vertical blades require thrust collars be added at time of damper manufacture and at additional cost. Some standard features are not available with vertical bladed dampers.

CD102 SUGGESTED SPECIFICATION

Furnish and install, at locations shown in plans or in accordance with schedules, industrial grade control dampers meeting the following construction standards: Frames shall be minimum 8" deep x 2" flanged 12 gage steel channel (203 x 51 x 2.8). The blades shall be maximum $7^3/_4$" (197) wide, minimum .080" (2) thick, 6063T5 extruded aluminum airfoil shaped with integral structural reinforcing tube running full length of each blade. Axles shall be minimum $^3/_4$" (19) diameter with machined edge to provide positive locking connection to blades and linkage. Full round axles are not acceptable. Bearings shall be stainless steel sleeve pressed into frame. Linkage shall be located in jamb out of airstream and constructed of 10 gage (3.5) galvanized steel clevis type arms, $^3/_{16}$" x $^3/_4$" (4.7 x 19) plated steel tie bars and $^3/_8$" (9.5) diameter stainless steel pivot pins with lock type retainers.

Submittal must include leakage, pressure drop and maximum pressure data based on AMCA Publication 500 testing. Damper shall be Ruskin model CD102 Control Damper.

ADD TO SPECIFICATION IF REQUIRED:
Dampers shall be equipped with blade and jamb seals for low leakage application. Blade seals shall be extruded silicone rubber mechanically locked into extruded blade slots. Adhesive type seals are not acceptable. Jamb seals shall be flexible stainless steel located between blade edge and jamb for maximum sealing compression. Wind stop type seals are not acceptable.

OD102 SUGGESTED SPECIFICATION

Furnish and install, at locations shown in plans or in accordance with schedules, fan outlet dampers meeting the following construction standards: Frames shall be minimum 8" deep x 2" flanged 12 gage steel channel (203 x 51 x 2.8). The blades shall be maximum $7^3/_4$" (197) wide, minimum .080" (2) thick, 6063T5 extruded aluminum airfoil shaped with integral structural reinforcing tube running full length of each blade. Axles shall be minimum $^3/_4$" (19) diameter with machined edge to provide positive locking connection to blades and linkage. Full round axles are not acceptable. Bearings shall be stainless steel sleeve bolted to frame. Bearings pressed nto frame are not acceptable. Linkage shall be located in jamb out of airstream and constructed of 10 gage (3.5) galvanized steel clevis type arms, $^3/_{16}$" x $^3/_4$" (4.7 x 19) plated steel tie bars and $^3/_8$" (9.5) diameter stainless steel pivot pins with lock type retainers.

Submittal must include leakage, pressure drop and maximum pressure data based on AMCA Publication 500 testing. Damper shall be capable of being mounted in any position for fan discharge and shall be capable of controlling or modulating the volume of air delivered by the fan, to shut off fan air flow and balance the system. Damper shall be Ruskin model OD102 Control Damper.

ADD TO SPECIFICATION IF REQUIRED:
Dampers shall be equipped with blade and jamb seals for low leakage application. Blade seals shall be extruded silicone rubber mechanically locked into extruded blade slots. Adhesive type seals are not acceptable. Jamb seals shall be flexible stainless steel located between blade edge and jamb for maximum sealing compression. Wind stop type seals are not acceptable.