

Damper Actuator Sizing Chart

One of the most frequent problems that technicians face is how to determine the correct torque actuator for their damper. These tables should help. First determine the size and type damper, then determine the air flow that the damper needs to open and close against. From that point, use the charts below to determine the amount of torque needed.

Torque Vector Table			
Air Velocity (Ft/Min)	Torque Factor (Lb. In/Ft ²)		
	< 1200	< 2500	< 3000
Damper Blade Style			
Opposed Blade No Seals	3	4.5	6
Opposed Blade with Seals	6	7.5	10
Parallel Blade No Seals	4	6	8
Parallel Blade with Seals	8.5	10.5	14



Opposed Blades without Seals			
Torque required (in.lbs.)			
sq.ft.	<1000 fpm	1000-2500 fpm	2500-3000 fpm
5	15	23	30
10	30	45	60
15	45	68	90
20	60	90	120
25	75	113	150
30	90	135	180
35	105	158	210
40	120	180	240

Opposed Blades with Seals			
Torque required (in.lbs.)			
sq.ft.	<1000 fpm	1000-2500 fpm	2500-3000 fpm
5	25	38	50
10	50	75	100
15	75	113	150
20	100	150	200
25	125	188	250
30	150	225	300
35	175	263	350
40	200	300	400



Parallel Blades without Seals

Torque required (in.lbs.)

sq.ft.	<1000 fpm	1000-2500 fpm	2500-3000 fpm
5	20	30	40
10	40	60	80
15	60	90	120
20	80	120	160
25	100	150	200
30	120	180	240
35	140	210	280
40	160	240	320

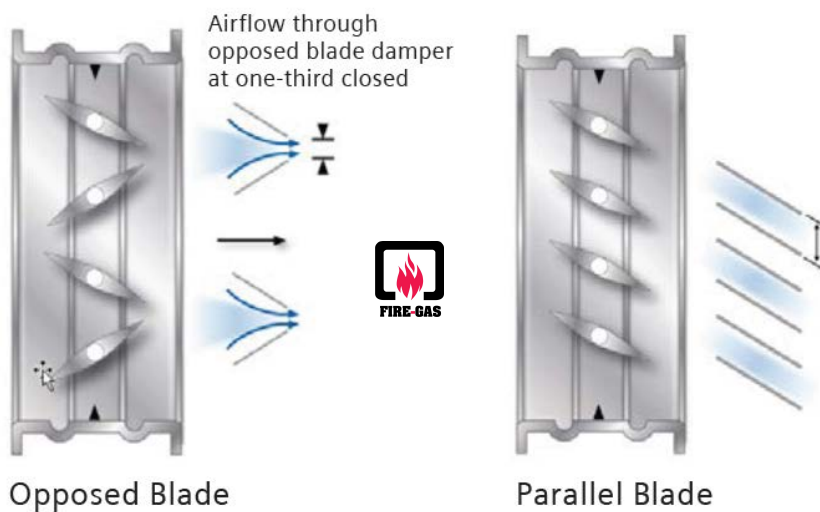
Parallel Blades with Seals

Torque required (in.lbs.)

sq.ft.	<1000 fpm	1000-2500 fpm	2500-3000 fpm
5	35	53	70
10	70	105	140
15	105	158	210
20	140	210	280
25	175	263	350
30	210	315	420
35	245	368	490
40	280	420	560

If possible, refer to the damper manufacturer's torque specification, to be sure.

Determine blade configuration



EXAMPLE:

In this example, the damper physical properties are 36 inches by 36 inches with opposed blade damper and seals and has a maximum air velocity of 2,000 ft/min. The next step is to find the required torque. To do that, multiply the torque factor by the square footage of the damper.

Torque Requirements	Opposed Blade Dampers with		Parallel Blade Dampers with	
	No Seals	Low Leakage Seals	No Seals	Low Leakage Seals
Maximum Pressures of 2 in. wg or Maximum Velocities of 1500 fpm	3 in-lb/ft ²	5 in-lb/ft ²	4 in-lb/ft ²	7 in-lb/ft ²
Maximum Pressures of 3 in. wg or Maximum Velocities of 2500 fpm	4.5 in-lb/ft ²	7.5 in-lb/ft ²	6 in-lb/ft ²	10.5 in-lb/ft ²
Maximum Pressures of 4 in. wg or Maximum Velocities of 3000 fpm	6 in-lb/ft ²	10 in-lb/ft ²	8 in-lb/ft ²	14 in-lb/ft ²

Torque Formula:

$$\text{Damper Area (Ft}^2\text{)} = \frac{36 \text{ (In)} * 36 \text{ (in)}}{144 \left(\frac{\text{In}^2}{\text{Ft}^2} \right)} = \frac{1,296 \text{ (In}^2\text{)}}{144 \left(\frac{\text{In}^2}{\text{Ft}^2} \right)} = 9 \text{ Ft}^2$$

$$\text{Torque Factor} \left(\frac{\text{LbIn}}{\text{Ft}^2} \right) = 10.5 \left(\frac{\text{LbIn}}{\text{Ft}^2} \right)$$

$$\text{Required Torque (LbIn)} = \text{Damper Area (Ft}^2\text{)} * \text{Torque Factor} * \text{Torque Factor} \left(\frac{\text{LbIn}}{\text{Ft}^2} \right)$$

$$9 * 10.5 = 94.5 \text{ LbIn}$$

$$94.5 \text{ Lb.In} * 0.11 = 10 \text{ Nm}$$



N05 Series

Honeywell



Torque:	44 lb-in (5Nm)
Running Time:	90 sec. independent of load
Control Input:	Floating and Two-position Modulating and Floating
Overload Protection:	Electronic Stall Protection throughout stroke
Rotation:	95° (adjustable)
Shaft Diameter:	3/8" ... 5/8" (9...16mm)
Manual Override:	Declutch push button
Direction of Rotation:	Selectable by switch
Dimensions:	5-9/32" x 2-7/16" x 2-19/32" (134 x 62 x 66 mm)
Electrical Connection:	Terminal strip with removable access cover
Built-in Auxiliary Switch:	2 x SPDT
Environment Protection:	NEMA 2 / IP54
Temp Rating:	-5°...140°F (-20°...60°C)

Model	Voltage	Control	Aux. Switch
MN6105A1011	24 Vac/dc +20%, -15%	Floating/Two-Position	No
MN6105A1201	24 Vac/dc +20%, -15%	Floating/Two-Position	Yes
MN7505A2001	24 Vac/dc +20%, -15%	Modulating/Floating	No
MN7505A2209	24 Vac/dc +20%, -15%	Modulating/Floating	Yes

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تیرماه 1397



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