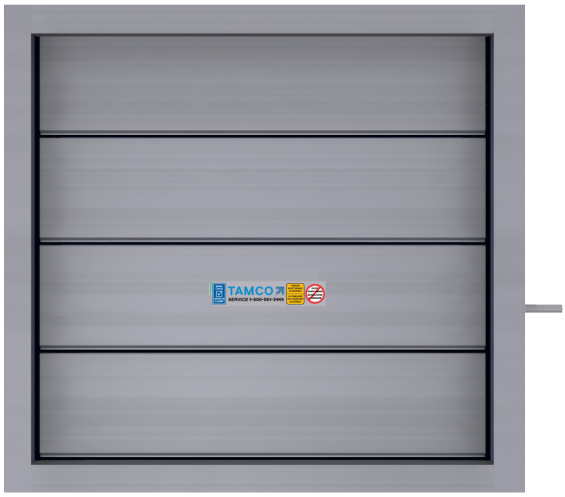
TAMCO

HEAVY-DUTY CONTROL DAMPER

INSTALLATION GUIDELINES - OPERATION - MAINTENANCE

READ ENTIRE INSTALLATION GUIDELINE MANUAL BEFORE INSTALLING DAMPERS.



TAMCO'S ALL-ALUMINUM CONTROL DAMPERS ARE CONSTRUCTED WITH MAINTENANCE-FREE BEARING AND LINKAGE COMPONENTS.

CAUTION:

- Never use any lubricants, such as grease or silicone, on any damper parts, including linkage, bearings or hardware. Lubricants attract dust. Accumulated dust particles can abrade and cause damage to damper bearings.
- In applications where the humidity level is unusually elevated, or where there are extremely high levels of dust and dirt particles, TAMCO recommends that the damper linkage and bearing system should be cleaned once a year. This can be done by blowing away dust using compressed air. If needed, a domestic-strength steam cleaner can be used to loosen dirt, which can then be blown out with compressed air, along with any remaining water droplets.
- **DO NOT ADJUST LINKAGE MECHANISM! IF PROBLEM STILL EXISTS AFTER VERIFICATION AND CORRECT ACTION, CALL TAMCO CUSTOMER SERVICE.**

STORAGE RECOMMENDATIONS:

- Store control dampers indoors to protect from dirt, dust, and weather. The storage space must be clean, dry, and free of elevated humidity or possible condensation. Do not store at temperatures in excess of 100 °F *(38 °C)*.
- The air must be breathable and contaminant-free.
- The dampers must be stored upright. They must not be stacked on top of, or leaning against each other.

Note that all technical information available on TAMCO's website at
www.tamcodampers.com
supersedes and takes precedence over all information contained within the printed catalog.

CALL TAMCO CUSTOMER SERVICE WITH ANY QUESTIONS CONCERNING TAMCO DAMPERS
1-800-561-3449

VERIFY DAMPER OPERATION BEFORE INSTALLATION!

- ✓ Before installing, inspect damper for possible damage caused in shipping, and that it has not been racked or twisted. Measure the damper from corner to corner to verify that it is square.
- ✓ If minor damage has occurred to frame corners or flanges, correct by bending or hammering back into position. Ensure correct realignment of repair, as bent or twisted frames might not mate properly with mounting angles, or additional damper sections.
- ✓ Do not install damper if damage is more than superficial, if uncertain as to extent of damage, or if damper does not seal correctly **call TAMCO Customer Service at 1-800-561-3449.**
- ✓ Operate damper section manually *(on a flat section of floor)* to verify correct blade action and sealing.

(A) Using drive rod, slowly apply closing torque, while ensuring that damper frame does not twist due to torque being applied. Larger dampers may require additional person to hold damper frame square and true.

(B) If possible, use daylight or inside light source as a backdrop while verifying blade operation. No light should be visible through damper.

EXERCISE CAUTION TO ENSURE FINGERS ARE NOT IN WAY OF MOVING LINKAGE PARTS OR BLADES.

INSTALLATION GUIDELINES | for TAMCO Heavy-Duty Control Dampers

FRONT / TOP END UP / RIGHT HAND

- TAMCO label is always adhered to the damper's drive blade, on the front (face) side of the damper.
- When labels on blades are viewed right side up, the damper orientation is Front/Top end up.
- When viewed as Front/Top end up, a right-hand (RH) damper has the drive rod as shown. Left-hand (LH) dampers have a drive rod on the left.
- The damper, as a complete unit, can be installed right side up, upside down, standing up, or lying flat.
- There is no specified air entry or air exhaust side for Series 8800 dampers. This includes all applicable Options.
- The system must support the damper. The damper cannot support the system.
- Duct work construction and bracing must be sufficient to support the damper. Do not use the damper to square up duct work.
- Ensure that the damper is installed to permit future access to the side linkage.
- For vertical blade applications, refer to the supplemental instructions provided in the Installing Vertical Blade Dampers document, available on the TAMCO website.
- A fixed ¾" *(19.05 mm)* hexagonal steel drive rod that extends 6" *(152.4 mm)* beyond the edge of the damper frame is provided as standard.

SECTION DRIVE SIDE

- Drive side will affect the direction the blades rotate to open and thereby affect the angle of airflow when parallel blades are not in the fully open position.
- Drive side will not affect the angle of airflow for opposed blade dampers. *It is important to consider drive side when ordering heavy-duty control dampers, particularly when parallel blades are required.*
- *Dampers can be ordered with drive rods on both sides.*

RIGHT HAND DRIVE

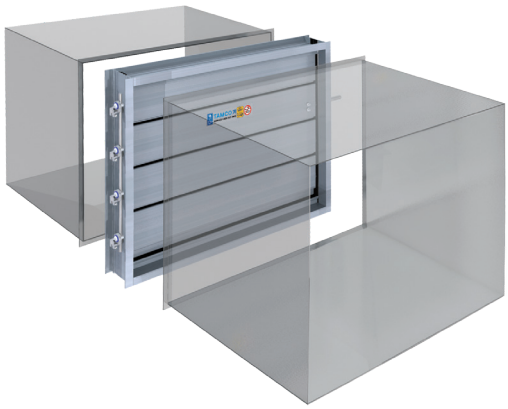
CCW ROTATION
TO OPEN

LEFT HAND DRIVE

CW ROTATION
TO OPEN

INSTALLING
FLANGED TO DUCT TYPE DAMPERS

- Damper must be installed square.
- Front and rear damper flanges are 2" *(50.8 mm)* larger than duct or opening, around entire perimeter.
- Damper is manufactured so that finished O.D. is 4" *(101.6 mm)* greater than opening width and height dimensions.
- Do not assume that duct is square. Verify that duct flange is square, flat and even.
- Verify that damper is square. Operate damper to verify free movement of blades and correct sealing.
- Fasten damper to duct. Re-verify that damper is square.
- Repeat procedure for other flange, if ducted on both sides.
- Caulk all connections/joints between damper frame and duct to minimize installation leakage.

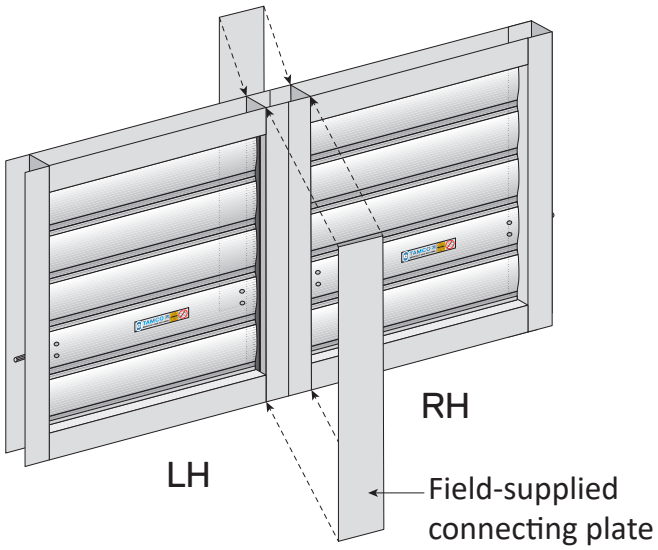


INSTALLING
MULTIPLE-SECTION DAMPERS

- Frame members are designed to butt up with each other.
- Sections are connected by fastening a 4" *(101.6 mm)* wide flat connecting plate *(field-supplied)* across the front and back of the frame members, where damper sections meet.
- Ensure that both sections are straight, even, and aligned with each other.

ILLUSTRATED DAMPER SHOWN IS FRONT/TOP END UP

RH = RIGHT-HAND DAMPER
LH = LEFT-HAND DAMPER



STRUCTURAL DESIGN REQUIREMENTS

For Multiple-Section Dampers

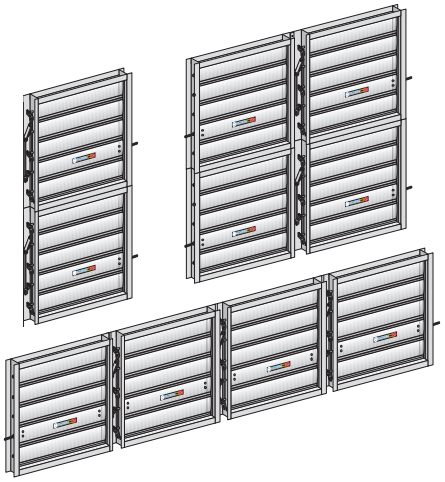
REQUIREMENTS:

- Intermediate structural support is required to resist applied velocity and pressure loads for dampers that consist of two or more sections in both height and width. *(See illustration to right.)*
- Field-supplied tubular structural steel support may be required for large multi-sectioned dampers.
- A TAMCO Series 8800 damper weighs approximately 7 lbs/ft² *(34.2 kg/m²)*.

MAXIMUM DEFLECTION:

- The structure providing intermediate support must be designed to resist the highest pressure load, with deflection of less than L/230. This applies whether the pressure load is created by the mechanical system, by wind load, or if the damper is mounted on the exterior of the building.

INTERMEDIATE, FIELD-SUPPLIED, STRUCTURAL SUPPORT IS REQUIRED WHEN INSTALLING IN BOTH THE VERTICAL AND HORIZONTAL PLANES.



STRUCTURAL SUPPORT DESIGN FOR TAMCO DAMPERS

Example:

Design the structural support required to carry TAMCO dampers at the 17th story of a building in Ottawa, Ontario, Canada. *(Assuming that the maximum internal pressure, as a result of the mechanical systems, is 2 inches of water, 10.4 psf or 500 Pa.)*

Assumptions:

The subject building is 17 floors high and has plan dimension of 120' by 120' *(36.6 m by 36.6 m)*. The dampers will be mounted on vertical framing members spanning from the 17th floor to the roof slab level.

Analysis:

Net wind pressure on damper = Exterior pressure or suction + Interior pressure in the mechanical plenum *(as specified by the mechanical engineer)*

$p = qC_eC_gC_p$ external + 10.4 psf 1997 OCB 4.1.8

Where: p = the specific external pressure acting statically and in a direction normal to the surface, either as a pressure directed towards the surface or as a suction directed away from the surface.

q = the reference velocity pressure based on a 1 in 30 probability of being exceeded in any one year for design of structural members for strength.
$q_{1/30}$ = 7.72 psf *(0.37 kPa in Ottawa, Ontario)*.

C_e = exposure factor based on the height of the building *(1.4 for a 170 ft. high building)*.

C_g = gust factor *(2.5 for cladding elements and small structural components)*.

C_p = external pressure coefficient *(1.0 for high local suction)*.

$p = qC_eC_gC_p$ external + 10.4 psf

p = 7.72 psf (1.4) (2.5) (1.0) + 10.4 psf

p = 37.4 psf

Total net factored pressure:

p_f = 1.5 *(live wind load)*

p_f = 1.5 • (37.4)

p_f = 56.1 psf *(2.7 kPa)*

Factored distributed load over vertical support framing member:

w_f = 56.1 psf (5')

w_f = 281 lb./ft.

Factored maximum moment:

$M_f = w_f l^2/8$

$M_f = 281 \bullet (10)^2/8$

M_f = 3513 lb./ft. *(4.8 kN•m)*

Resisting moment:

M_r has to be equal to or greater than M_f for an unsupported length of 10' *(3.05 m)*

Acceptable vertical support member:

C4 x 6.25 - 4" structural steel channel
(metric designation C100 x 9)

M_r = 3980 lb.ft. for an unsupported length (Lu) = 13'.
(M_r = 5.4 kNm at Lu = 4m)

Check deflection criteria:

Maximum allowable deflection is L/230 = 10'/230 = 0.52" *(13.2 mm)*

Maximum deflection at mid-height of the channel:

$$\Delta = \frac{5\ w\ l^4}{384\ E\ I}$$

For deflection, the reference velocity pressure, q, is based on a 1 in 10 probability of being exceeded in any one year. $q_{1/10}$ = 6.27 psf *(0.30 kPa in Ottawa, Ontario)*.

$p = qC_eC_gC_p$ external + 10.4 psf

p = 6.27 psf (1.4) (2.5) (1.0) + 10.4 psf

p = 32.3 psf

w = 32.3 psf (5')

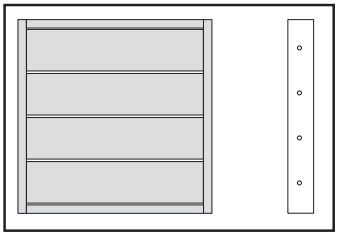
w = 162 lb./ft.

$$\Delta = \frac{5\ (162\ \text{lb./ft.})\ (10')^4}{384\ (29{,}000\ \text{ksi})\ (4.25\ \text{in}^4)}$$

$$\Delta = \frac{5\ (13.5\ \text{lb./ft.})\ (120")^4}{384\ (29 \bullet 10^6\ \text{psi})\ (4.25\ \text{in}^4)} = 0.30\ \textit{(7.6 mm)}$$

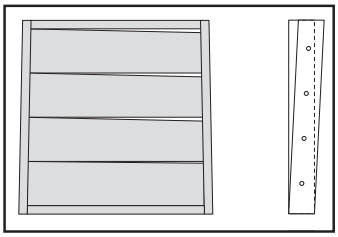
Therefore, an acceptable vertical support member for this example is a C4 x 6.25 *(metric designation C100 x 9)*.

GUIDE FOR TROUBLESHOOTING



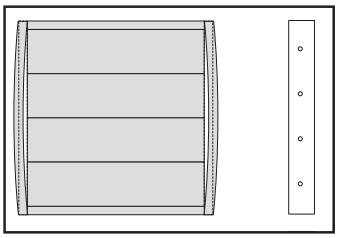
UNDER- OR OVER-ROTATION OF BLADES

- If light lines are present across the full length of the blade, check that closing torque being applied is neither too little nor too much.
- Under-rotation will not let blade gaskets compress, whereas over-rotation can cause blades to re-separate.



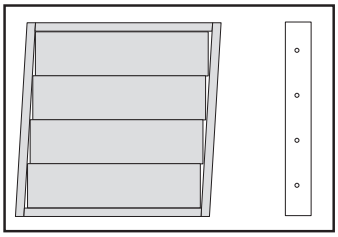
TWISTED FRAME

- If light lines are observed only along half of the blade length, square up the position of the top frame member, relative to the bottom frame, by pivoting the top frame member either in or out.
- A small movement in one of these two directions could seal light lines, by eliminating frame distortion caused by torque being applied to an unsecured damper.



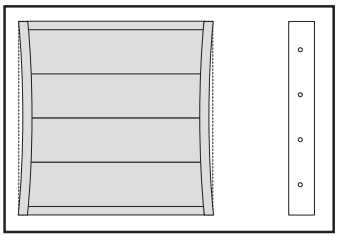
STRETCHED FRAME

- If light lines are observed between the side frame members and the blade ends of a damper, especially near the center line, verify measurements across the damper at the top, center, and bottom.
- If the measurements should vary by more than $^{1}/_{16}$" *(2 mm)*, readjust the side mounting angles to bring the side frame members to the correct dimension, thus matching top and bottom dimensions.
- If light lines disappear, ensure that these matching dimensions are retained when fastening mounting angles during installation.



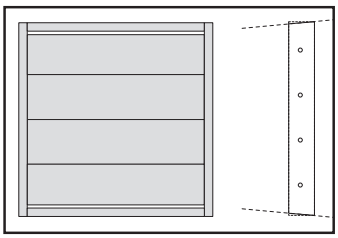
RACKED FRAME

- If light lines appear only near the top and bottom, on opposite sides of the damper, between the side frame members and the blade ends of a damper, verify square positioning with a tape measure and adjust if required.
- Move the top frame member either left or right to square up the damper. Light lines should disappear.



COMPRESSED FRAME

- If the damper is hard to operate by hand, verify that frame sides are not squeezed in or twisted.
- In either case, bearing life could be sharply reduced.
- Verify that frame sides are parallel by measuring across the damper at the top, center, and bottom.
- Also verify that dimensions on both sides of the damper are equal.



DISTORTED FRAME

- If light appears only between the last blade and the top or bottom of the damper frame, it may be due to the top or bottom frame member being distorted (twisted) when fastened to the duct work.
- Ensure that the top or bottom frame members are not distorted, by loosening fasteners and shimming the frame, if required.

DO NOT ADJUST LINKAGE MECHANISM. IF PROBLEM STILL EXISTS AFTER VERIFICATION AND CORRECT ACTION, CALL TAMCO CUSTOMER SERVICE

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