STANDARD MULTIPLE SECTION DRIVE ARRANGEMENTS AND ACTUATOR SIZE GUIDE MODEL SERIES: 2200TB & 2200TBF

1. Thermally Broken Control Dampers are classified as follows:
   With Thermally Broken Frames — 2200TBF
   Without Thermally Broken Frames – 2200TB

   Maximum single section size is 60" wide x 78" high (1524 x 1981) for Hat Channel (HC) Frame.

   Maximum single section size is 60" wide x 76" high (1524 x 1930) for Quick Connect (QC) Frame.
2. Dampers larger than the maximum single section size are fabricated in multiple section assemblies. These assemblies consist of sections of equal size which are coupled together with a jackshaft. The jackshaft runs parallel to the width ("w") dimension. This jackshaft configuration is not available to Quick Connect Dampers.
   A. 1/'2" (13) Diameter Jackshaft:
      - Used on two sections wide with a maximum of 32 sq. ft. with blade and jamb seals.
   B. 1" (25) Diameter Jackshaft:
      - Used on two sections wide over 32 sq. ft. with blade and jamb seals.
      - Used on assemblies of more than two sections wide, regardless of area.

   Maximum Section Size for Hat Channel Multiple Section Dampers: 60" wide x 78" high (1524 x 1981).

   Maximum Section Size for Quick Connect Multiple Section Dampers: 60" wide x 76" high (1524 x 1930).

   Maximum Multi-Section Size for Quick Connect Dampers: 96" wide x 152" high (2438 x 3860).
3. Use the details on page 2 and 3 to determine how multiple section dampers with standard construction and sizes up to 240" wide x 234" high (6096 x 5943) will be manufactured. Details do not apply if the control damper has any of the following non-standard features:
   A. Unequal section sizes.
   B. Face and By-pass arrangement.

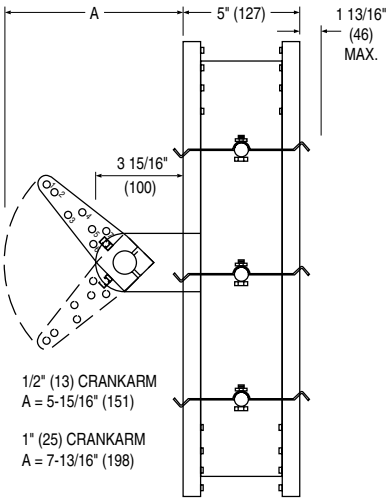
   For sizes larger than 240" x 234" (6096 x 5943), consult factory.
4. How to determine your damper configuration:
   A. Calculate the damper area in square feet:

      $$\text{Area} = \frac{(\text{W in. wide} \times \text{H in. high})}{144} = _____ \text{ sq. ft.}$$

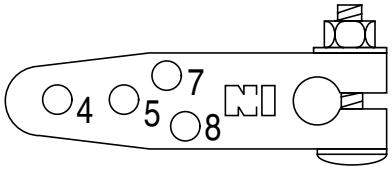
   B. Based on the W and H dimensions and the area of your damper, determine the appropriate assembly detail using the chart on page 2.
      Example: Model 2200TBF 96" wide x 96" high.

      $\text{Area} = \frac{(96 \times 96)}{144} = 64$ sq. ft. From chart and drawings, damper configuration is per detail 22Q.

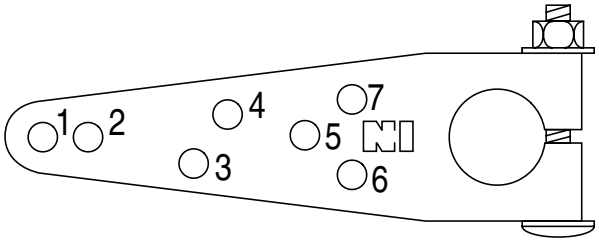
      Your Damper will be built this way.
5. Multiple section assemblies require bracing to support the weight of the assembly and to hold against system pressure. Appropriate bracing must support the damper horizontally at least once for every 8 ft.(2438) of damper width. Vertical assemblies and higher system pressures require more bracing.
6. The maximum shipping size is 120" x 78" (3048 x 1981) or two sections wide. Larger units are shipped in sections for field assembly. Refer to the Control Damper Installation Instructions on page 4 for joining sections.
7. Optional 1/2" (13) dia. and 1" (25) dia. crankarms are available for field applications that utilize linear type actuators (usually pneumatic). You can order the crankarms illustrated below (at additional cost) by the associated part number.



CLEARANCE REQUIREMENTS



1/2" (13) DIA. CRANK ARM (OPTIONAL)
PART NO. CD005



1" (25) DIA. CRANK ARM (OPTIONAL)
PART NO. CD010

HOLE NO.	CRANK ARM RADIUS
8	1 3/8" (35)
7	1 9/16" (40)
6	1 9/16" (40)
5	2" (51)
4	2 13/16" (72)
3	3 3/16" (81)
2	4 1/4" (108)
1	4 3/4" (121)

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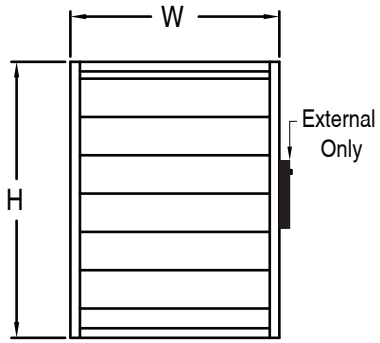
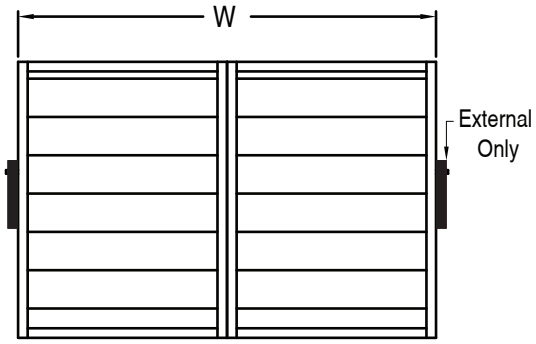
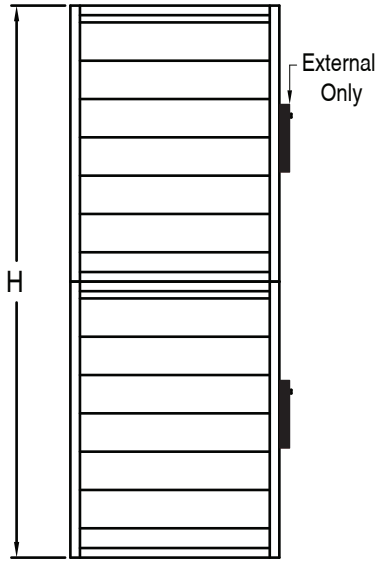
DIMENSION "H" HEIGHT IN INCHES (mm)	DIMENSION "W" WIDTH IN INCHES (mm)				Note:
	THRU 60" (1524)	OVER 60" (1524)	OVER 120" (3048)	OVER 180" (4572)	
76" (1930) AND UNDER	DETAIL 11 Q	DETAIL 21 Q	-	-	Number of actuators and actuator selection is dependent on damper square footage.
152" (3861) AND UNDER	DETAIL 12 Q	DETAIL 22 Q	-	-	



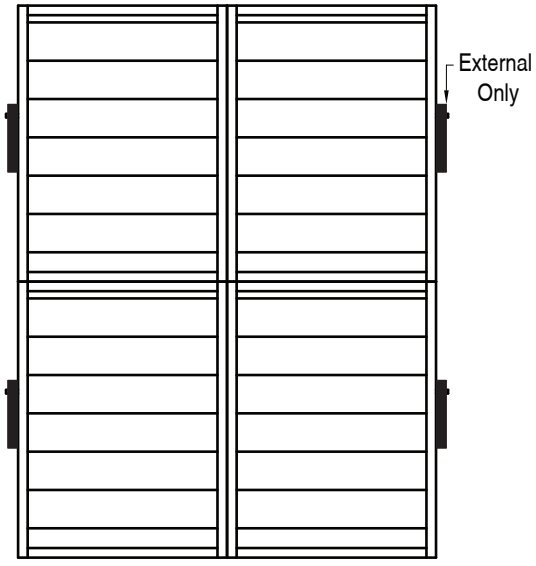
Detail 11Q
Single Section



Detail 21Q
2 Sections Wide
2 Actuators, 1 per section



Detail 12Q
2 Sections Tall



Detail 22Q
2 Sections Wide
2 Sections Tall
4 Actuators, 1 per section

Note: Jackshafts are not available for Quick Connect Dampers.

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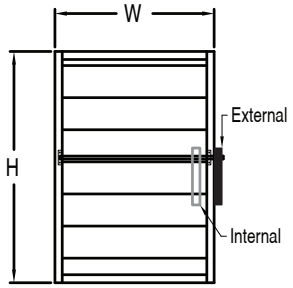
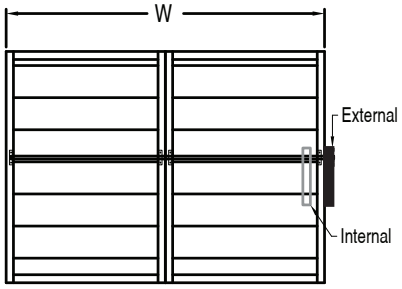
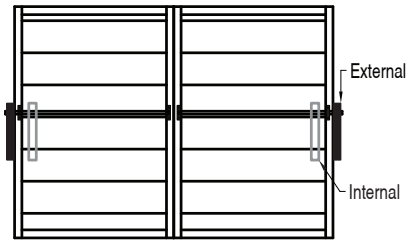
DIMENSION "H" HEIGHT IN INCHES (mm)	DIMENSION "W" WIDTH IN INCHES (mm)				Note:
	THRU 60" (1524)	OVER 60" (1524)	OVER 120" (3048)	OVER 180" (4572)	
78" (1981) AND UNDER	DETAIL 11 Q	DETAIL 21 S or D	DETAIL 31 S or D	DETAIL 41 S or D	Number of actuators and actuator selection is dependent on damper square footage.
156" (3962) AND UNDER	DETAIL 12 S or C	DETAIL 22 S or D	DETAIL 32 S or D	DETAIL 42 S or D	



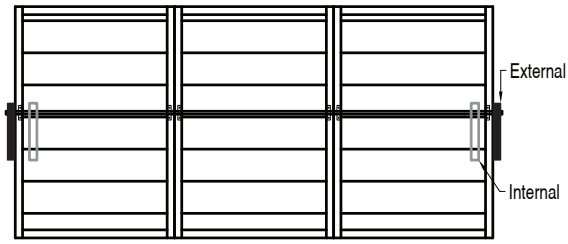
Detail 11
Single Section



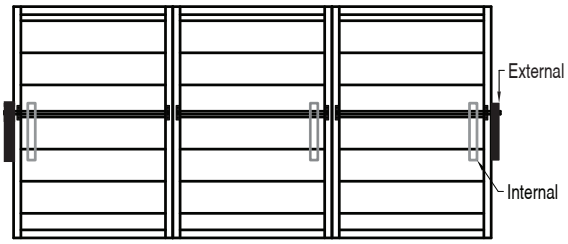
Detail 21S
2 Sections Wide
1 Actuator



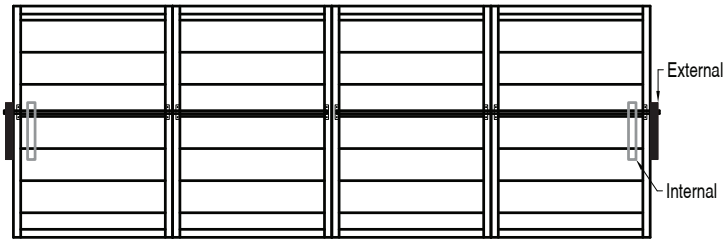
Detail 21D
2 Sections Wide
2 Actuators, 1 per section



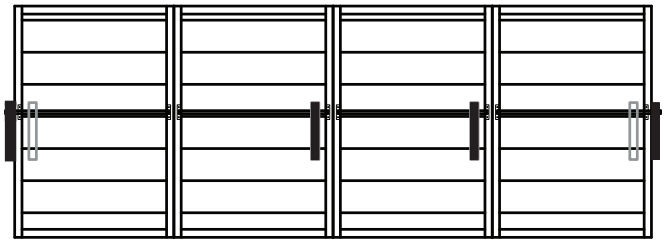
Detail 31S
3 Sections Wide
2 Actuators



Detail 31D
3 Sections Wide
3 Actuators, 1 per section



Detail 41S
4 Sections Wide
2 Actuators, 1 per 2 sections



Detail 41D
4 Sections Wide
4 Actuators, 1 per section

NOTE: Couplings shall be provided to allow jackshaft connections for dampers over 2 sections wide.

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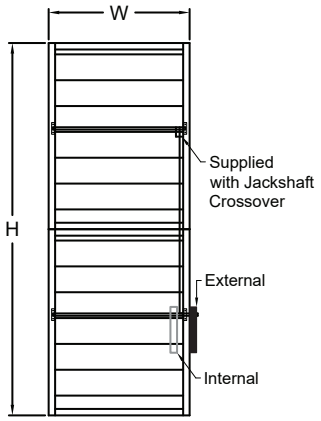
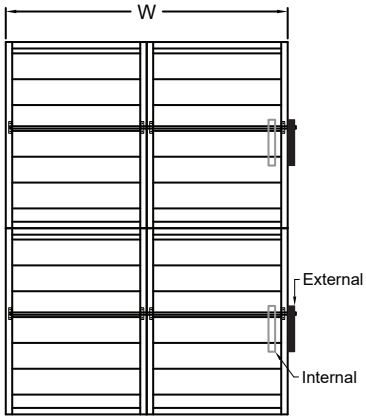
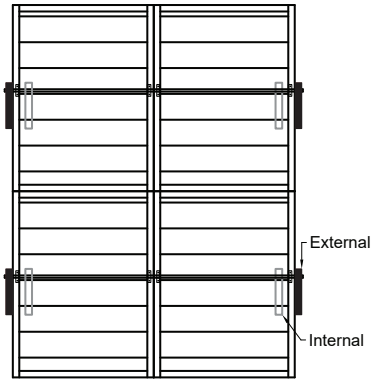


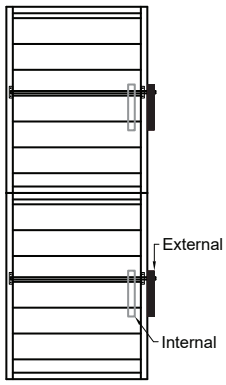
Detail 12C
2 Sections Tall
1 Actuator



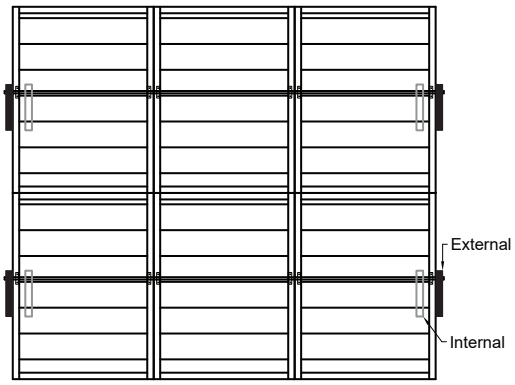
Detail 22S
2 Sections Wide
2 Sections Tall
2 Actuators



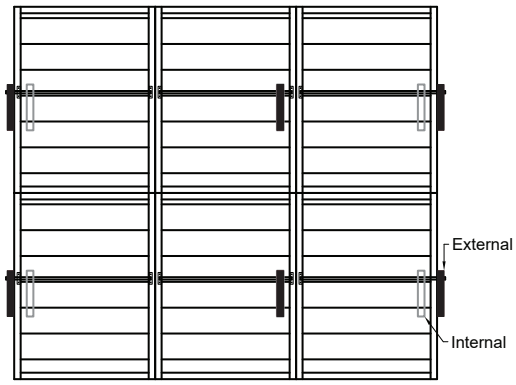
Detail 22D
2 Sections Wide
2 Sections Tall
4 Actuators, 1 per section



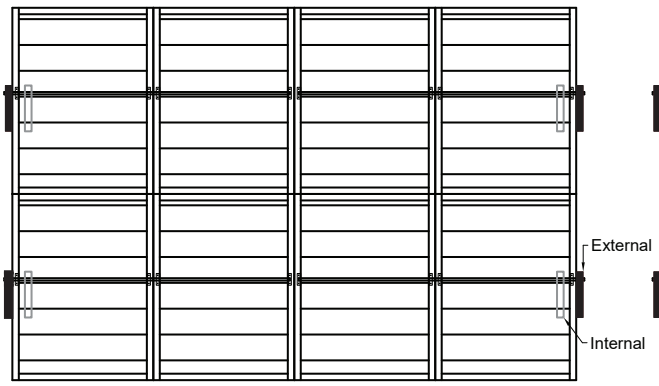
Detail 12S
2 Sections Tall
2 Actuators
1 per section



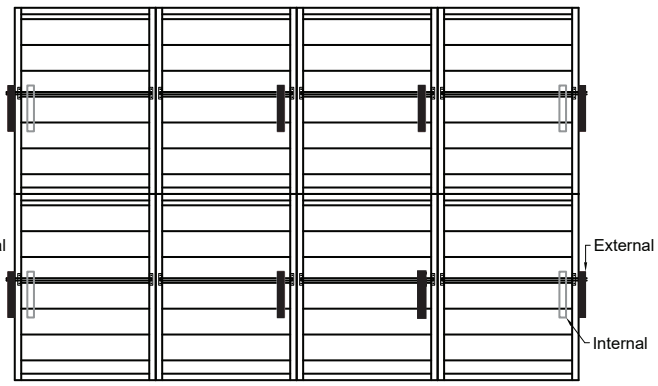
Detail 32S
3 Sections Wide
2 Sections Tall
4 Actuators



Detail 32D
3 Sections Wide
2 Sections Tall
6 Actuators, 1 per section



Detail 42S
4 Sections Wide
2 Sections Tall
4 Actuators, 1 per 2 sections



Detail 42D
4 Sections Wide
2 Sections Tall
8 Actuators, 1 per section

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INSTALLATION INSTRUCTIONS

RECEIVING/INSPECTION

Upon delivery, inspect shipping containers and dampers carefully. Note any damage on trucker's delivery receipt. Contact the freight company within 24 hours for inspection. Do not install dampers. It is easier to repair on the floor than in the duct.

STORAGE

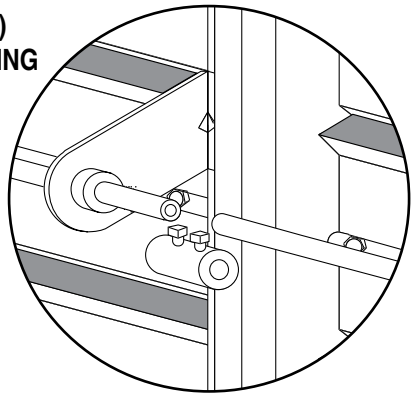
Store in an orderly manner. Do not pile dampers on each other. Cover with plastic sheeting to protect from excessive moisture, dirt and debris. Avoid unnecessary handling of dampers.

INSTALLATION

Handle dampers by frame only. Do not lift by blades, linkage, actuator or jackshaft. Use sufficient people to evenly lift multiple section assemblies. Do not drop, drag, step on, or apply excessive bending, twisting or racking. Cycle dampers by hand before installation to ensure freedom of movement.

1. Inspect ductwork or opening where damper will be installed for any obstructions and to ensure it is straight and level. It is essential to support ductwork to prevent sagging due to damper weight.
2. Determine location of extended drive shaft or jackshaft before installation.
3. Position damper shipping sections together in duct or opening. Align and match frame markings on adjacent sections (see fig. 1).
4. Align holes on adjacent frame sections and fasten together on front and back sides with screws or nuts and bolts.
5. Use shims as appropriate between damper frame and duct opening and between damper sections as necessary to prevent distortion of frame by fasteners. Ensure fasteners do not interfere with blade movement or damper linkage. Bracing is required at every horizontal mullion for strength and to support weight. Vertical bracing is recommended at every 8 feet minimum of damper width for strength. Dampers in high velocity and/or high pressure systems require more bracing.
6. If the damper assembly is supplied with unjoined jackshafting and is operated by only one actuator, join jackshaft ends using coupling and set screws or nuts and bolts provided (see fig. 2).
7. If applicable, connect lower and upper jackshafts with the connecting rod crossover supplied, through the swivel on crank arm at each jackshaft. Locate crank arm close to a jackshaft bearing bracket and not centrally in order to minimize play (see fig. 2).
8. Ensure dampers are set completely square, plumb and free from racking, twisting or bending and are free to operate without binding (see fig. 3). A clearance must be maintained between blade and blade bearing. Move blade solidly to one side against bearing and measure clearance at other end. If jamb seals are present, compress to determine clearance. Dampers must operate without binding. Before system operation, cycle damper after installation to assure proper operation. On multiple section assemblies, (with jackshaft coupling) all sections should open and close simultaneously.
9. After installation of low leakage dampers with seals, caulk between frame and duct or opening to prevent leakage.

1/2" (13) COUPLING DETAIL



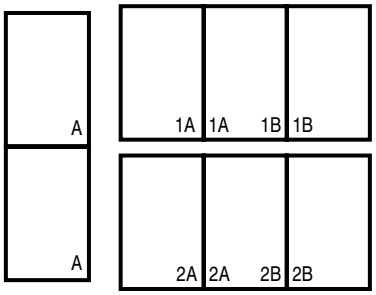
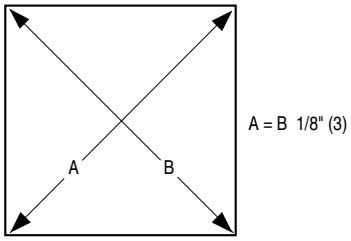


FIGURE 1.

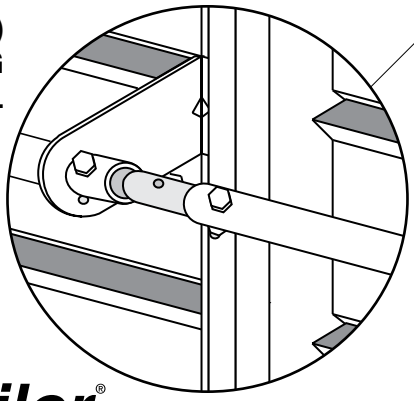


Individual damper sections and multiple assemblies must be square.

Both dimensions across the diagonal must be equal ± 1/8" (3).

FIGURE 3.

1" (25) COUPLING DETAIL



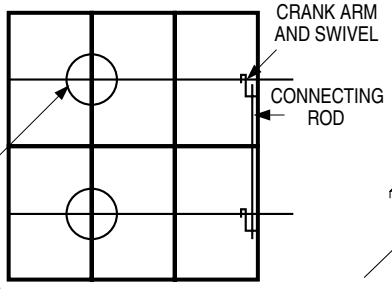


FIGURE 2.

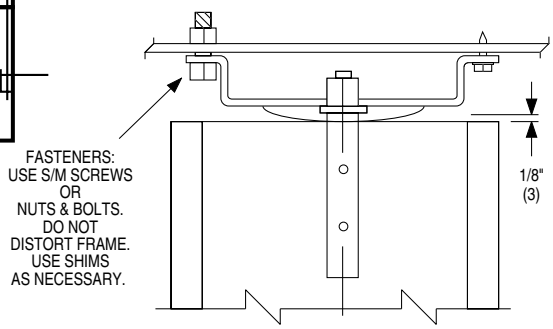


FIGURE 4.

Nailor® Industries Inc.

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Calgary, Canada
Tel: 403-279-8619
Fax: 403-279-5035

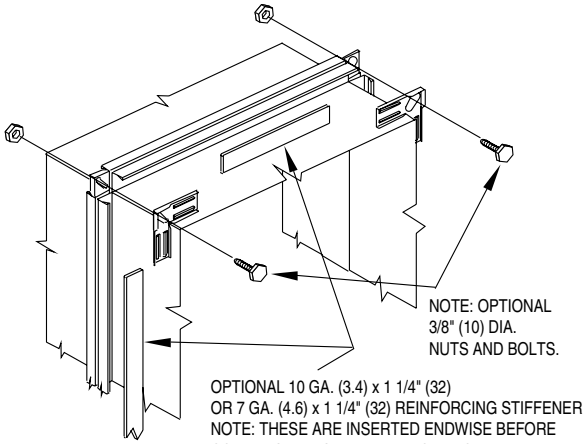
QUICK CONNECT MOUNTING & INSTALLATION

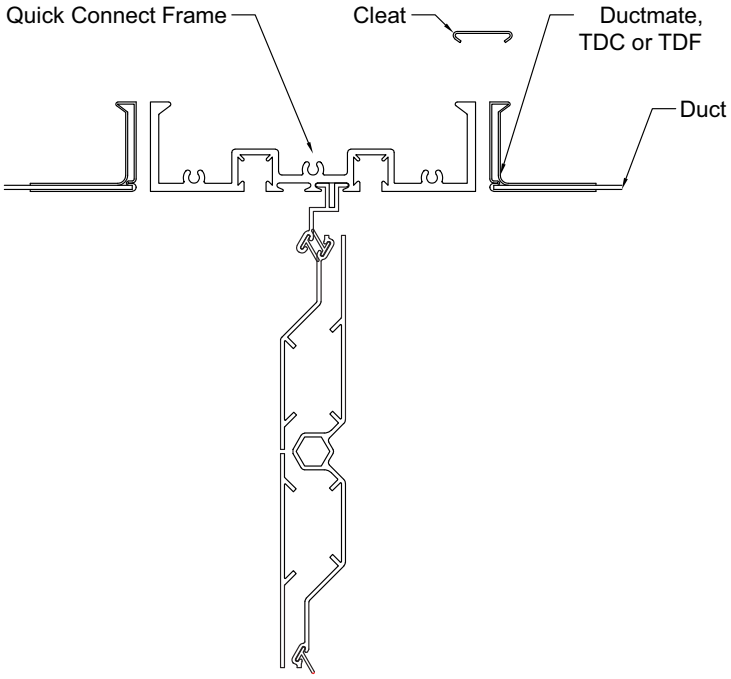
1. Seal the two flange systems together with either a sealant or a gasket.
2. Align the quick connect frame and the flange assembly. 3/8 in. (9mm) bolts may be used in the corners to help align the dampers. These bolts do not need to be removed.
3. Install the metal cleat (See figure) or #10 TEK screw with the following recommended spacing:

Width or Height	# of screws or cleats per side
≤ 18 in. (457mm)	1
> 18 in. ≤ 24 in. (457 – 610mm)	2
> 24 in. ≤ 48 in. (610 – 1220mm)	3
> 48 in. ≤ 60 in. (1220 – 1524mm)	4
> 60 in. ≤ 72 in. (1524 – 1829mm)	5

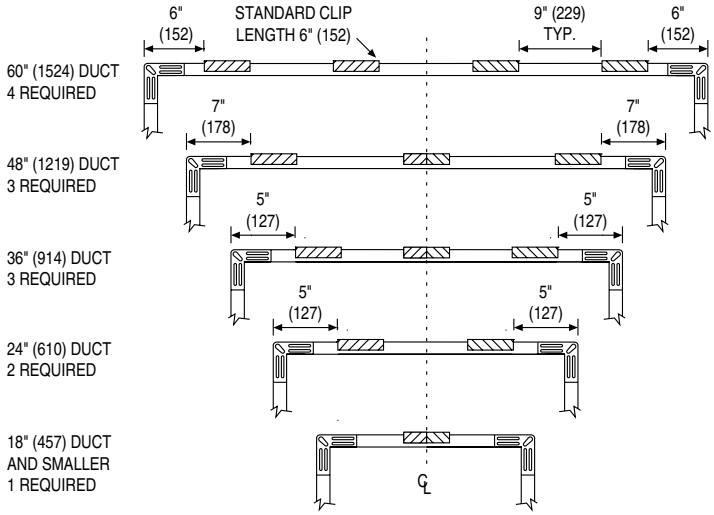
INSTALLATION:

TDC and TDF roll-formed 4-bolt flanged connections assembled per the manufactueres instructions using gaskets, metal cleats 6" (152) long with spacing as shown and four 3/8" (9.5) metal nuts and bolts. See also the TDC or TDF addendum to the SMACNA Duct Construction Standards.

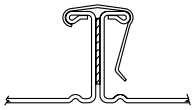


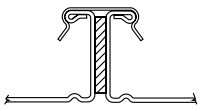


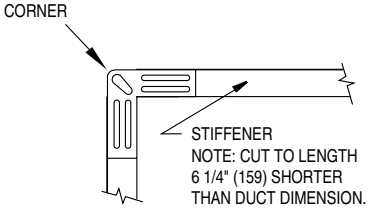
RECOMMENDED CLIP SPACING



CLEAT DETAILS







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