

**MODELS 1810 & 1820  
MANUAL BALANCING DAMPERS  
STEEL**

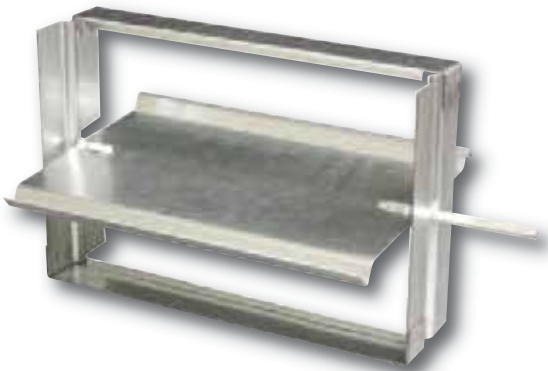
Models 1810 and 1820 have been engineering and designed for manual balancing applications in low to medium pressure and velocity commercial HVAC systems. Ruggedly built, they provide a cost effective and reliable damper for reduced volume control and offer an economical manufactured product alternative to custom 'shop built' dampers that exceed the volume damper designs recommended by SMACNA. Features include a sturdy galvanized steel hat channel frame with die-formed corner gussets for reinforcement and superior structural strength, a vee groove blade design that maximizes strength and optimizes airflow and no-maintenance concealed linkage located out of the airstream, totally enclosed within the damper frame for reduced air turbulence, noise and pressure drop.



Models 1810 & 1820

**MODEL 1870  
MANUAL BALANCING DAMPER STEEL  
SINGLE BLADE**

Model 1870 Manual Balancing Damper is a ruggedly built, economical branch duct balancing damper designed for manual balancing applications with rectangular ductwork. The 1870 installs quickly and easily, saving time and money on installation costs. The low profile 18 ga. (1.3) frame and sills allow maximum free area and the ribbed forms in the blade and frame provides extra strength. A locking manual hand quadrant is provided with each damper.



Model 1870

**MODEL 1890  
MANUAL BALANCING DAMPER  
ROUND DUCT**

Model 1890 Manual Balancing Damper is a steel butterfly damper designed for all types of round ductwork balancing applications and is suitable for use in low pressure and velocity commercial HVAC systems. The design features a sturdy beaded casing ideal for round spiral ductwork connections, and a corrosion resistant steel blade that can be locked in any position with the hand quadrant that is supplied as standard with the damper. The 1890 installs quickly and easily and becomes part of the ductwork, saving time and money on installation costs and is an economical alternative to a shop built damper.



Model 1890

**MODEL 1370  
BACKDRAFT DAMPER  
EXTRUDED ALUMINUM • LIGHT/MEDIUM DUTY**

Model 1370 is an extruded aluminum gravity operated backdraft damper for use in light to medium duty commercial HVAC applications to pass airflow in one direction and to prevent airflow in the opposite direction. Standard features include a corrosion resistant extruded aluminum reinforced mitered corner frame that resists racking, aerodynamic extruded aluminum blades that overlap the jambs for maximum weather protection, extruded PVC blade seals that provide quiet closure as well as extra weather protection, corrosion resistant long life synthetic bearings and a concealed blade linkage for low pressure drop that provides smooth operation at system velocities of up to 1500 fpm (7.6 m/s).



Model 1370

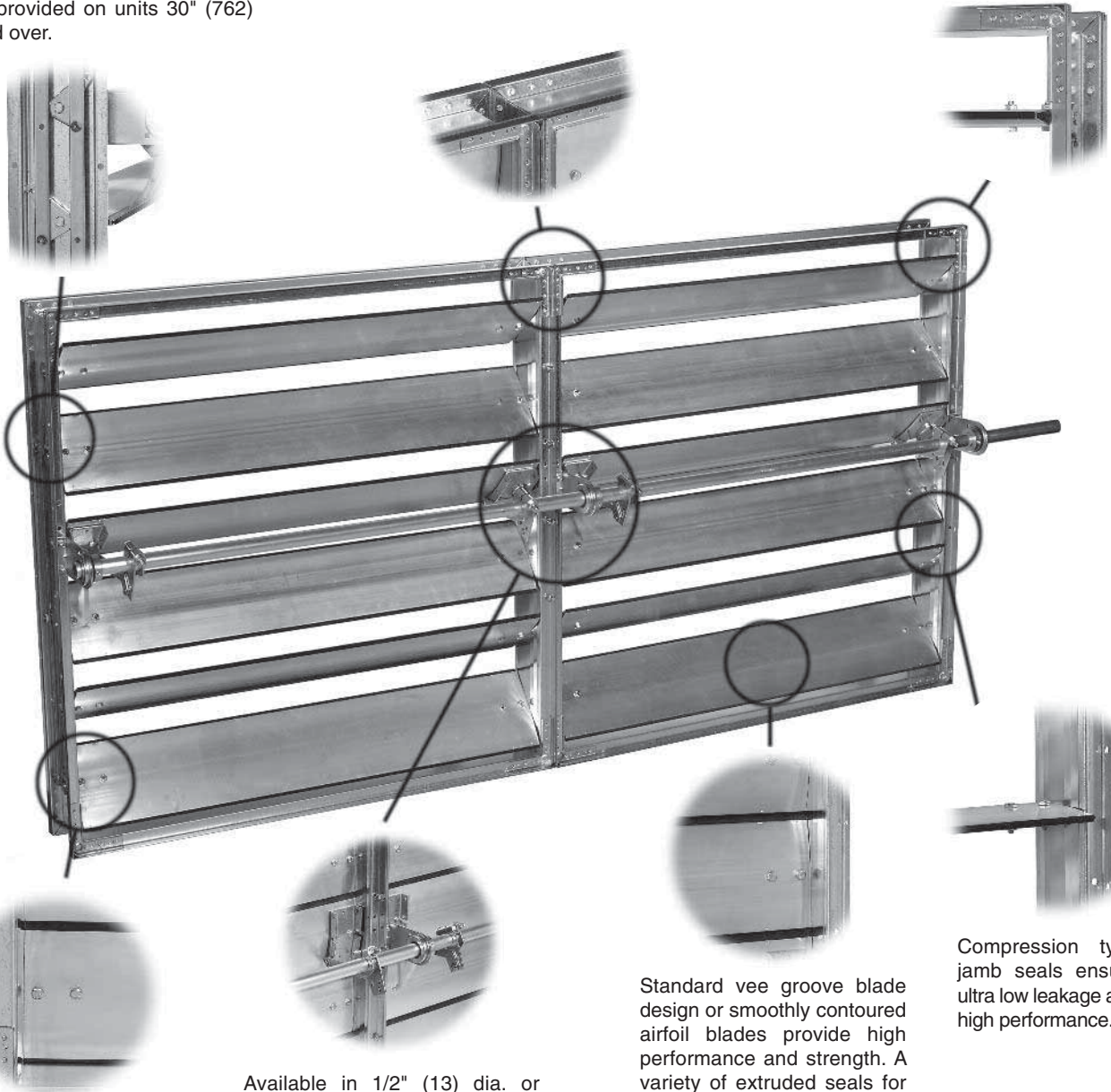
## FEATURES OF NAILOR CONTROL DAMPERS

At Nailor Industries, we take pride in putting our years of experience in manufacturing premium quality dampers to work for you with every control damper we make. We've learned a lot since producing our first damper in 1971 and have incorporated that knowledge into the latest designs and features that are offered today. With Nailor dampers you're in control! We manufacture your control dampers with the remarkable quality features shown below and with a multitude of options you can select from to meet your specific requirements. With Nailor's fast lead times, your control dampers will be on site when you need them. Premium quality, reasonable cost and versatility are just some the standard features found on all Nailor products!

Nailor's robust blade linkage provides firm, precise blade connections for smooth operation, concealed in frame, out of airstream for reduced turbulence and pressure drop. Double linkage provided on units 30" (762) wide and over.

Rugged 16 ga. (1.6) hat channel frame design provides strength equivalent to heavier gauge U-channel frames.

Corners are mitered and reinforced with die-formed gussets for superior rigidity and strength that virtually eliminates racking.



Each axle is fastened to blade end with double thru-bolts providing superior no-slip axle connections. Choice of bearings to suit application.

Available in 1/2" (13) dia. or heavy duty 1" (25) dia. shaft. A robust linkage, bearing brackets and blade connections provide optimum operation on larger dampers.

Standard vee groove blade design or smoothly contoured airfoil blades provide high performance and strength. A variety of extruded seals for various applications provide low-leakage characteristics that lead the industry.

Compression type jamb seals ensure ultra low leakage and high performance.

Quality dampers by Nailor Industries . . . Now you're in control!

B  
CONTROL DAMPERS

## CONTROL DAMPER TESTING

All AMCA certified dampers are subject to the guidelines of the Certification Ratings Program and are tested in accordance with AMCA Standard 500-D, *Laboratory Methods of Testing Dampers for Rating*. All Nailor non-AMCA certified control, balancing and backdraft dampers are tested in an independent laboratory and testing is conducted in accordance with AMCA Standard 500-D.

There are three common test setups to test pressure drop referenced in AMCA 500-D: Fig. 5.2, Fig. 5.3 and Fig. 5.5 (see below). All Nailor control dampers are tested using the configuration shown below in Fig. 5.3, illustrating a fully ducted damper. All Nailor backdraft dampers are tested using the configuration shown in Fig. 5.5, illustrating a plenum mounted damper. Fig. 5.3 yields the lowest pressure drop of the three test configurations due to minimized entrance and exit losses of the upstream and downstream straight duct runs. Fig. 5.5 has the highest pressure drop due to extremely high entrance and exit losses due to the sudden changes of area in the system.

Pressure drop data within this section has been corrected to represent standard air at a density of 0.075 lb/ft<sup>3</sup> (1.2 kg/m<sup>3</sup>) and this data is representative of laboratory conditions. The actual pressure drop of 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.

With any damper application, the amount of air leakage through the damper should be considered. If the application requires low leakage characteristics, the damper should be provided with seals. Nailor Industries offers a variety of low leakage rated dampers with blade and jamb seals suitable for most commercial and light industrial HVAC applications.

The sealing performance of a closed damper is described by the airflow leakage rate through the damper for a given pressure differential across the damper. The established sealing performance is usually expressed (or plotted) as cfm per sq. ft. (m<sup>3</sup>/s per m<sup>2</sup>) through the face area of a damper versus measured pressure differential across the damper. The published sealing performance is calculated in accordance with AMCA Standard 500-D and is a statement of the worst-case performance based on testing various damper sizes.

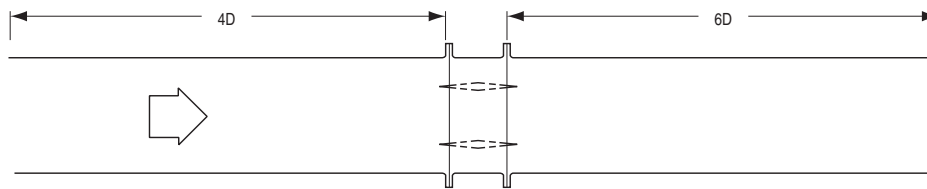


FIG. 5.3

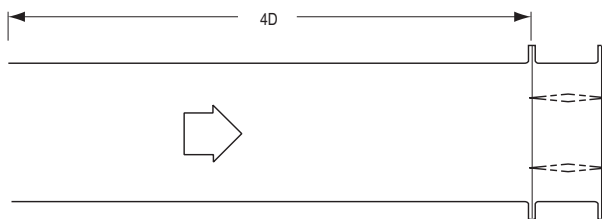


FIG. 5.2

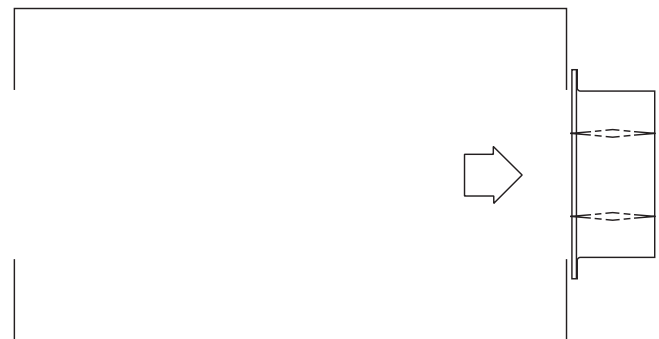


FIG. 5.5

- FOR MANUAL BALANCING
- STANDARD PERFORMANCE
- GALVANIZED STEEL

**Models:**

- 1810 Parallel Blade
- 1820 Opposed Blade



Model 1810

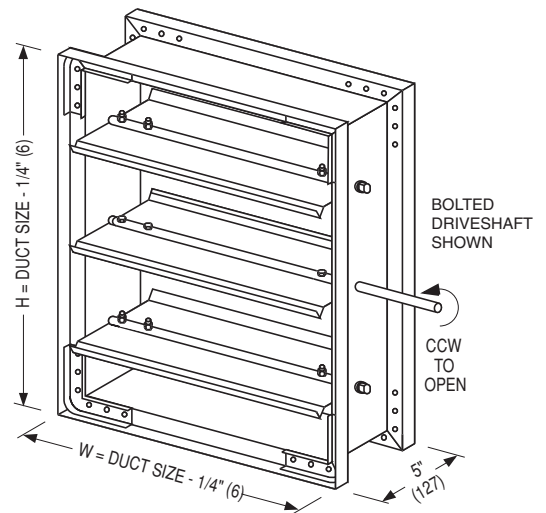
Model 1820

Models 1810 and 1820 have been engineering and designed for manual balancing applications, suitable for use in low to medium pressure and velocity commercial HVAC systems. Ruggedly built, they provide a cost effective and reliable volume control damper and offer an economical manufactured product alternative to custom 'shop built' dampers and exceed the volume damper designs recommended by SMACNA.

Standard design features include a sturdy 16 ga. (1.6) galvanized steel hat channel frame with die-formed corner gussets for reinforcement, an interlocking vee blade design that maximizes strength and optimizes airflow, double bolted no slip blade axle connections with long life corrosion resistant synthetic bearings and a no-maintenance concealed plated steel linkage located out of the airstream in the side frame for reduced air turbulence, noise and pressure drop.

**STANDARD CONSTRUCTION:**

- Frame:** 5" x 7/8" x 16 ga. (127 x 22 x 1.6) galvanized steel hat channel with die-formed corner gussets. Low profile (flat top and bottom) on dampers 10" (254) high and under.
- Blades:** 6" (152) wide on 5 1/2" (140) centers. 16 ga. (1.6) galvanized steel vee groove blade design. Parallel or opposed action.
- Linkage:** Concealed type totally enclosed within the frame and out of the air stream. Plated steel.
- Bearings:** 1/2" (13) Dia. Celcon®.
- Axles:** 1/2" (13) dia. plated steel double bolted to blades.
- Drive Shaft:** 6" (152) long x 1/2" (13) dia. double bolted fixed driveshaft that can be easily removed; or optional 6" (152) long x 1/2" (13) dia. lock-on drive shaft (standard in Canada). Drive shaft on each damper section.



**Models 1810 and 1820 Sizes (Duct W x H):**

Minimum		Maximum	
Single Section		Single Section	Multiple Section
Single Blade 6" x 4" (152 x 102)	Two Blades (parallel or opposed) 8" x 10" (203 x 254)	48" x 72" (1219 x 1829)	96" x 144" (2438 x 3658)

Temperature Range: -50°F to 250°F (-46°C to 121°C)

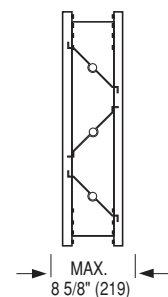
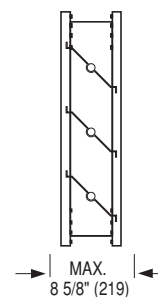
1810/1820 Series - Maximum Performance Ratings	
Maximum Velocity	2000 fpm (10 m/s)
Maximum Pressure	2.5 in. w.g. (625 Pa)

**COMMON OPTIONS:**

- Type 304 Stainless Steel construction.
- Round or oval duct transitions.
- Manual Hand Locking Quadrants with optional 2" (51) stand-off bracket.

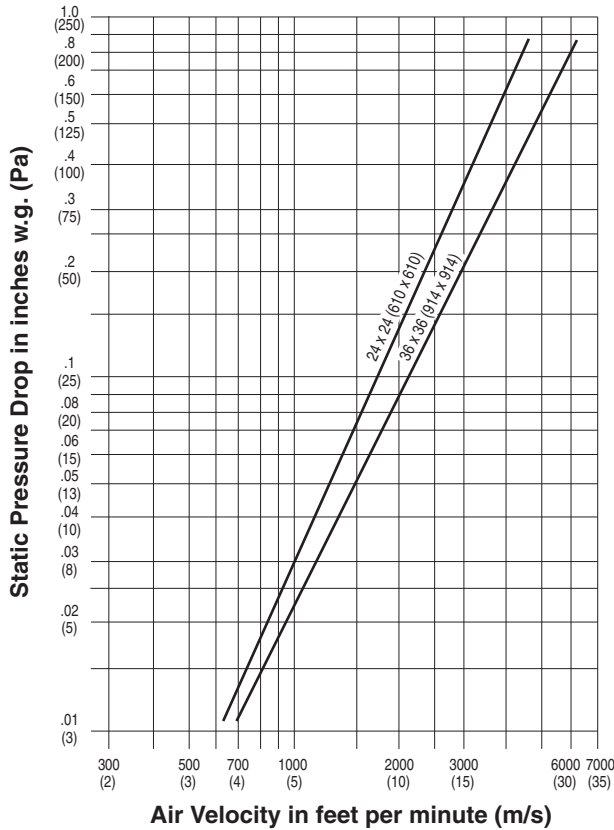
**MODEL 1810**  
PARALLEL BLADE

**MODEL 1820**  
OPPOSED BLADE



## MODELS: 1810 AND 1820 MANUAL BALANCING DAMPERS

PRESSURE DROP (damper fully open):



Tested per AMCA standard 500-D, Fig. 5.3.

## HOW TO ORDER OR TO SPECIFY

### MODELS: 1810 AND 1820 - MANUAL BALANCING DAMPERS

EXAMPLE: 1810 - 24x24 - 304 - DLO - DR - BC - CR - HLQ

**1. Models**

- 1810 Steel, Vee Blade, Parallel
- 1820 Steel, Vee Blade, Opposed

**2. Duct Size**

Width x Height (inches [mm's])

**3. Construction**

- GLV Galvanized Steel (default)
- 304 Type 304 Stainless Steel

**4. Drive Shaft Option**

- DSR Rigid (default USA, International)
- DLO Lock-on Drive Shaft (default CAN)

**5. Drive Location**

- DR Right or Left Hand

**6. Bearings**

- BC Celcon (default)
- BO Oilite Bronze
- BS Stainless Steel

**OPTIONS & ACCESSORIES:**

**7. Transition**

- None (default)
- CR Round
- CO Oval

**8. Hand Locking Quadrant**

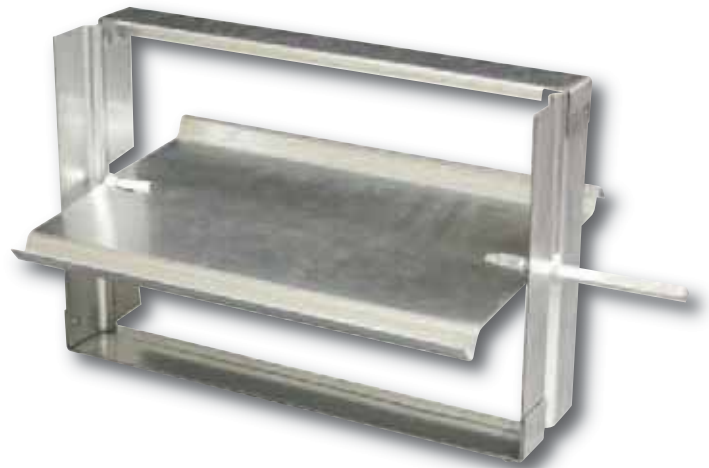
- None (default)
- HL2 Quadrant with 2" (51) Bracket
- HLQ Hand Locking Quadrant

**SUGGESTED SPECIFICATION:**

Provide and install, as shown on plans and/or schedules, manual balancing dampers as manufactured by Nailor Industries, Inc. which meet or exceed the following criteria: Frame shall be constructed of 16 ga. (1.6) galvanized steel hat channel with mitered corners and die-formed corner gussets for rigidity and structural strength equivalent to 13 ga. (2.4) channel type frames. Blades shall be of vee groove design, 16 ga. (1.6) galvanized steel, on maximum 6" (152) centers. Blade axes shall be 1/2" (13) dia. plated steel, double thru-bolted to blade at each end. Hex, square friction-fit or press-fit axes are not acceptable. Bearings shall be Celcon® molded synthetic type. Blade linkage shall be zero-maintenance, out of airstream and totally concealed within the frame. Provide each damper section with a hand locking quadrant for positive setting of blades at any position. Standard of acceptance shall be Nailor Industries (**specifier to select**) Model 1810 parallel blade or Model 1820 opposed blade manual balancing damper.

- FOR MANUAL BALANCING
- SINGLE BLADE
- GALVANIZED STEEL

**Model:**  
**1870 Single Blade**



Model 1870

Model 1870 Manual Balancing Damper is a ruggedly built, economical branch duct balancing damper designed for manual balancing applications with rectangular ductwork. Model 1870 installs quickly and easily, becoming part of the ductwork saving time and money on installation costs. It offers an economical manufactured product alternative to custom 'shop built' dampers and meets the volume damper designs recommended by SMACNA. The low profile 18 ga. (1.3) frame and sills allow maximum free area and the ribbed forms in the blade and frame provides extra strength. A locking hand quadrant is provided with each damper for manual operation.

**STANDARD CONSTRUCTION:**

- Frame:** 3" wide x 18 ga. (76 wide x 1.3) galvanized steel.  
**Blades:** 20 ga. (1.0) galvanized steel up to 24" x 12" (610 x 305).  
 18 ga. (1.3) galvanized steel above 24" x 12" (610 x 305).  
**Shaft:** 1/4" (6) square plated steel.  
**Quadrant:** Plated steel with locking operator (shipped loose).

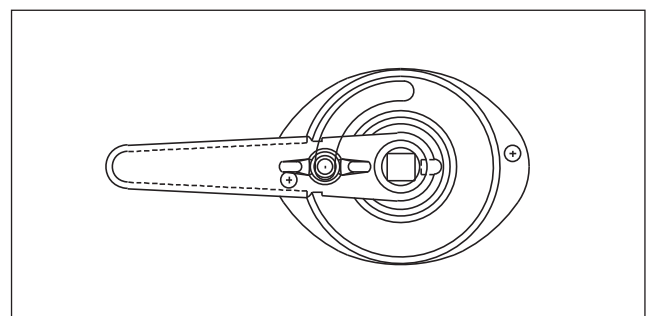
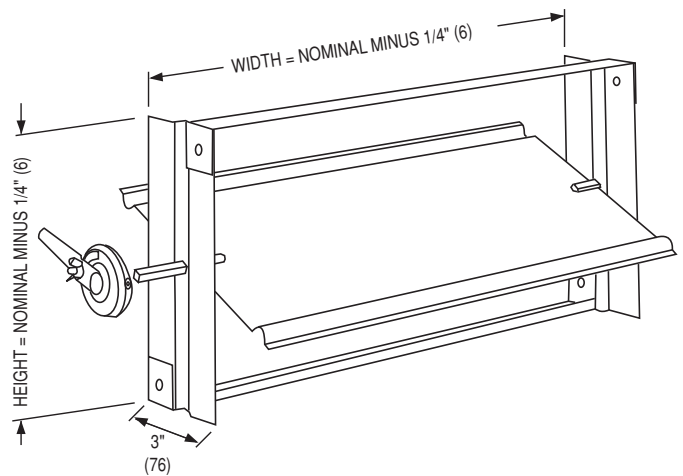
**Model 1870 Sizes (Duct W x H):**

Minimum	Maximum
Single Section	Single Section
4" x 4" (102 x 102).	36" x 12" (914 x 305).

**Note:** For larger sizes: refer to Models 1810 and 1820.

Temperature Range: -50°F to 180°F (-46°C to 82°C)

1870 Series - Maximum Performance Ratings	
Maximum Velocity	1500 fpm (7.6 m/s)
Maximum Pressure	2 in. w.g. (500 Pa)



**LOCKING QUADRANT**

- MANUAL BALANCING DAMPER
- FOR ROUND DUCT
- GALVANIZED STEEL

**Model:**

**1890 Single Blade Balancing Damper**



Model 1890

Model 1890 Manual Balancing Damper is a steel butterfly damper designed for all types of round ductwork balancing applications and is suitable for use in low pressure and velocity commercial HVAC systems. The 1890 installs quickly and easily and becomes part of the ductwork, saving time and money on installation costs and is an economical alternative to a "shop built" damper. The design features a sturdy corrosion resistant beaded casing ideal for round spiral ductwork connections and a corrosion resistant steel blade that can be locked in any position with the hand quadrant that is supplied as standard with the damper. A variety of options are available to meet specific requirements and applications.

**STANDARD CONSTRUCTION:**

**Frame:** 22 ga. (.86) corrosion-resistant steel with stiffening beads up to 12" (305) dia. 20 ga. (1.0) over 12" (305).

**Blades:** 22 ga. (.86) corrosion-resistant steel up to 12" (305) dia. 20 ga. (1.0) over 12" (305).

**Drive Shaft/Axle:** 1/4" (6) dia. plated steel bolted to blade.

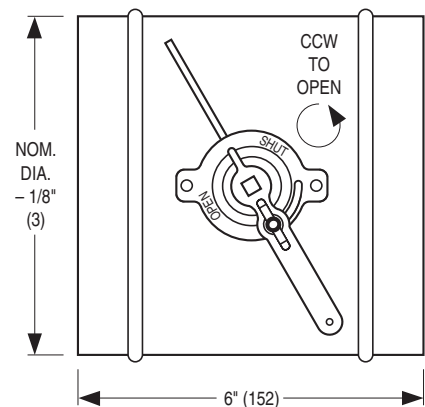
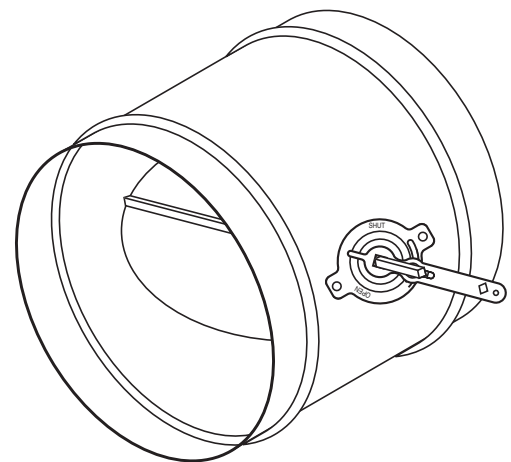
**Quadrant:** Plated steel with locking operator (factory installed).

**Model 1890 Sizes (Duct W x H):**

Minimum	Maximum
Single Section	Single Section
4" (102) dia.	20" (508) dia.

Temperature Range: -50°F to 250°F (-46°C to +121°C)

1890 Series - Maximum Performance Ratings	
Maximum Velocity	2000 fpm (10 m/s)
Maximum Pressure	2 in. w.g. (500 Pa)



**B**  
BALANCING DAMPERS

## HOW TO ORDER OR TO SPECIFY

### MODEL: 1870

### MANUAL BALANCING DAMPERS

EXAMPLE: 1870 - 18 x 10 - DR - SB

1. **Model**

1870 Steel, Single Blade

2. **Duct Size**

Width x Height (inches [mm's])

3. **Drive Location**

DR Right or Left Hand (default)

4. **Stand-Off Bracket**

- None (default)
- SB 2" (51) Stand-Off Bracket  
(for Externally Insulated Duct)

**SUGGESTED SPECIFICATION:**

Provide and install, as shown on plans and/or schedules, single blade manual balancing dampers as manufactured by Nailor Industries, Inc. which meet or exceed the following criteria: Frame shall be constructed of 18 ga. (1.3) galvanized steel with structural ribs for maximum strength and low profile for maximum free area. Blades shall be constructed of 20 ga. (1.0) galvanized steel up to 24" x 12" (610 x 305); 18 ga. (1.3) galvanized steel above 24" x 12" (610 x 305), with structural ribs for extra strength. Blade shafts to be 1/4" (6) square plated steel, complete with a hand locking quadrant for positive setting of blade at any position. Standard of acceptance shall be Nailor Industries Model 1870.

### MODEL: 1890

### ROUND BALANCING DAMPERS

EXAMPLE: 1890 - 12 - A38Q - BO - SB

1. **Model**

1890 Steel, Single Blade, Round

2. **Duct Size**

Diameter - inches (mm's)

3. **Optional Axles/Quadrant**

- A14Q 1/4" (6.35) Square Axle  
(w/Hand-Locking Quadrant) (default)
- A38 3/8" (10) Square Axle  
(No Lock Quadrant)
- A38Q 3/8" (10) Square Axle  
(w/Hand-Locking Quadrant)

4. **Bearings**

BO Oilite Bronze

5. **Stand-Off Bracket.**

- None (default)
- SB 2" (51) Stand-Off Bracket  
(for Externally Insulated Duct)

**SUGGESTED SPECIFICATION:**

Provide and install, as shown on plans and/or schedules, round balancing dampers as manufactured by Nailor Industries, Inc. which meet or exceed the following criteria: Frame shall be constructed of 22 ga. (0.86) corrosion resistant steel with roll-formed stiffening beads up to 12" (305) dia.; 20 ga. (1.0) over 12" (305) dia.. Blades shall be constructed of 22 ga. (0.86) corrosion resistant steel up to 12" (305) dia.; 20 ga. (1.0) over 12" (305) dia. Blade shaft shall be 1/4" (6) square plated steel, complete with a hand locking quadrant for positive setting of blade at any position. Standard of acceptance shall be Nailor Industries Model 1890.



## Options and Accessories

Nailor control dampers are available with a variety of options and accessories to suit the majority of commercial and light industrial applications and installations. With short lead times and marginal effect on costs, Nailor control dampers can be custom tailored to suit virtually any requirement.

### MATERIAL OPTIONS:

**OPTION CODE 304**  
STAINLESS STEEL CONSTRUCTION

#### 1000/1100 Series

All parts of damper (except blade seals) will be constructed of 304 stainless steel. Provides higher corrosion resistance against harsh atmospheric and process elements. Consult your Nailor representative for specific application suitability.

**OPTION CODE ALS**  
ALUMINUM CONSTRUCTION WITH  
STAINLESS STEEL HARDWARE

#### 2000 Series

Damper will be constructed with aluminum frame and blades with stainless steel linkage, bearings, axles and related hardware. Suitable for use in high humidity applications such as swimming pool areas etc.

**OPTION CODE EAF**  
EXTRUDED ALUMINUM FRAME

#### 2000 Series

Rugged Type 6063-T5 extruded aluminum frame for premium performance. See Models 2010-EAF/2020-EAF for further details.

**OPTION CODE SSF**  
STAINLESS STEEL FRAME

#### 2000 Series

Damper frame will be constructed from 304 stainless steel, fully welded with corner reinforcing brackets. Provides an extra rigid frame that is more corrosion resistant than galvanized steel.

### BEARING OPTIONS:

**OPTION CODE BC**  
CELCON® BEARINGS



Synthetic type Celcon® bearings provide long life and corrosion free operation. Standard bearing for all 1000 and 1800 series dampers.

**OPTION CODE BO**  
OILITE® BRONZE BEARINGS



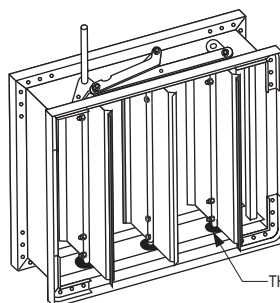
Bronze sintered (oil impregnated) self-lubricating oilite bearings provide long time lubrication making them ideal for use in applications where proper maintenance is uncertain or difficult.

**OPTION CODE BS**  
STAINLESS STEEL BEARINGS



304 grade stainless steel bearings provide corrosion resistance in a wide variety of corrosive media. In higher heat applications, provides good oxidation resistance.

**OPTION CODE BT**  
THRUST BEARINGS



For use when damper is mounted with blades running vertically. Installed against lower blade edge to reduce friction due to weight of blades. When ordering, specify which side of damper will be bottom.

## FLANGED FRAME OPTIONS:

Available as an option on Series 1000, 1100 and 2000 steel hat channel frame control dampers, the 1 1/2" (38) flanged frames allow for direct fastening to wall or unit housings as well as flanged ductwork. Damper inside dimension can be sized to match ductwork inside dimension, providing a smooth transition that produces lower pressure drop and less turbulence across the damper. Flange frames are also available with optional 9/32" (7) dia. bolt holes on 6" (152) centers for fast, convenient installation.

### OPTION CODES

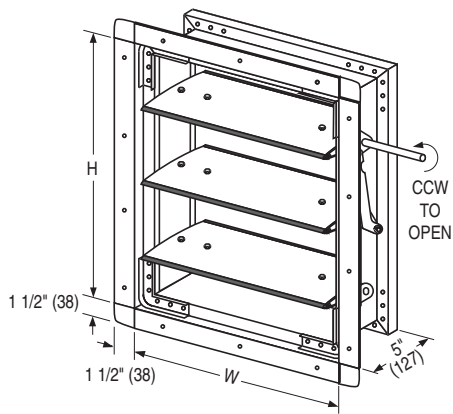
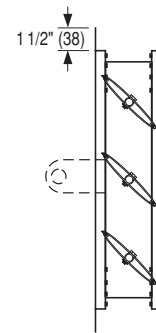
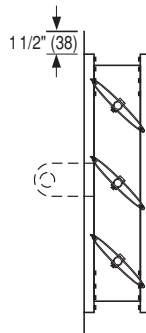
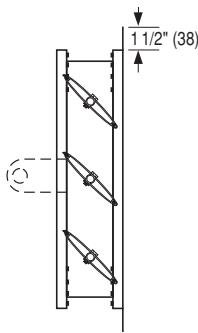
- FF** FLANGED FRONT
- FFB** FLANGED FRONT WITH BOLT HOLES

### OPTION CODES

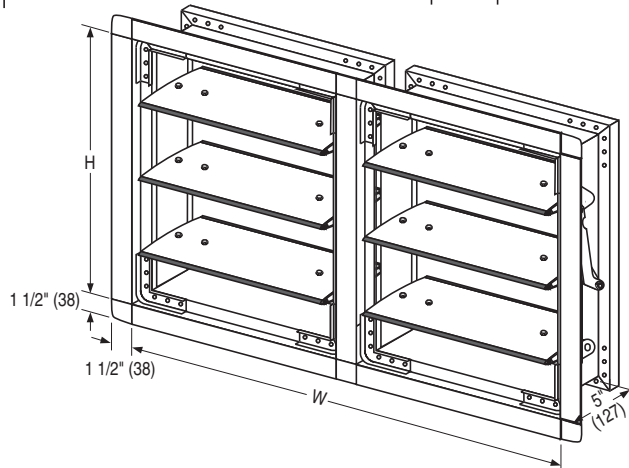
- FR** FLANGED REAR
- FRB** FLANGED REAR WITH BOLT HOLES

### OPTION CODES

- FD** DOUBLE FLANGE
- FDB** DOUBLE FLANGE WITH BOLT HOLES



SINGLE SECTION DAMPER SHOWN WITH **FRB** OPTION: FLANGED REAR FRAME WITH 9/32" (7) DIA. BOLT HOLES ON 6" (152) CENTERS.



MULTIPLE SECTION DAMPER SHOWN WITH **FR** OPTION: FLANGED REAR FRAME (JACKSHAFT NOT SHOWN)

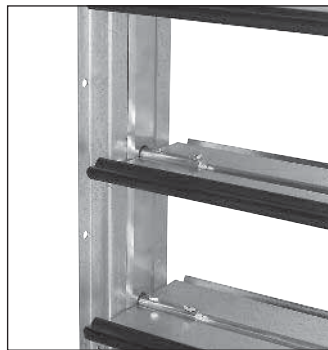
## JAMB SEAL OPTIONS:

**OPTION CODE JSM**  
METALLIC JAMB SEALS



Standard compression type metallic jamb seal used for reducing air leakage between blade ends and frame. Standard jamb seals on Models 1010 and 1020.

**OPTION CODE JSS**  
STAINLESS STEEL JAMB SEALS

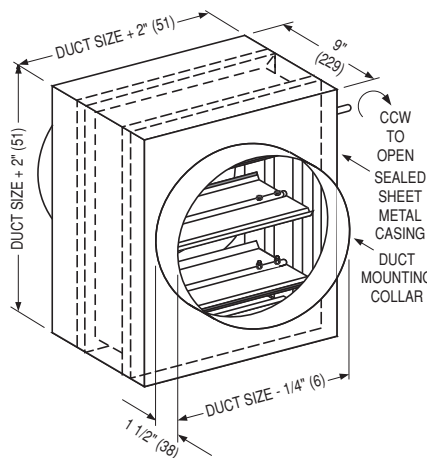


Compression type cambered stainless steel jamb seal for reducing air leakage between blade ends and frame. Provides higher resistance to corrosion and heat than our standard metallic jamb seal. Standard on Model Series 1100 and 2000 dampers.

## ROUND/OVAL TRANSITIONS:

**OPTION CODE CR**  
TRANSITION ENCLOSURE FOR ROUND DUCT.

**OPTION CODE CO**  
TRANSITION ENCLOSURE FOR OVAL DUCT



The CR transition enclosure option allows for connection of multi-blade control dampers to round ductwork. The CO transition enclosure option allows for connection of multi-blade control dampers to oval ductwork. Casing and collars are constructed from 20 ga. (1.0) galvanized steel (18 ga. (1.3) on sizes 36" x 36" (914 x 914) and up) and are tack welded and caulked against leakage.

**MAXIMUM SIZE:**

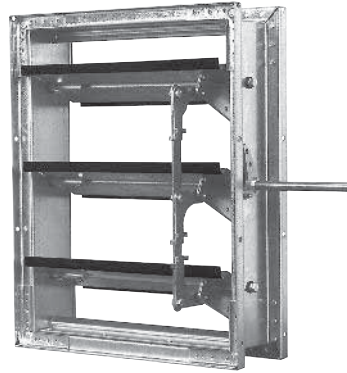
Single section: 46" (1168) dia.  
For larger sizes contact factory.

TYPE CR (FOR ROUND DUCT) SHOWN

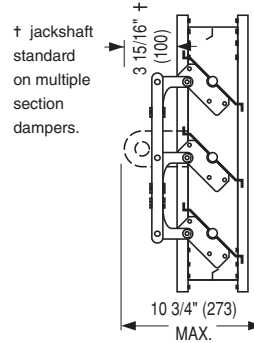
## BLADE LINKAGE OPTION:

OPTION CODE **LF**  
FACE LINKAGE

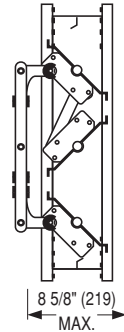
Nailor's robust plated steel linkage, uniquely installed directly to face of blades with integral heavy-duty brackets. Provides positive blade to blade connection while providing 'in the airstream' accessibility to linkage without removing damper from duct.



Model 1010 with Face Linkage (LF) option.



**Parallel Blade**  
(Model 1010 Shown)



**Opposed Blade**  
(Model 1020 Shown)

## LINKAGE MATERIAL OPTIONS:

OPTION CODE **SSL**  
STAINLESS STEEL LINKAGE

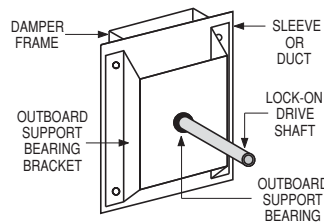
All linkage, axles and bearings will be of Type 304 Stainless Steel. Provides better resistance to corrosion and resistance to oxidation in higher heat applications.

OPTION CODE **SSA**  
STAINLESS STEEL AXLES ONLY

Blade axles only will be of Type 304 Stainless Steel. Provides better resistance to corrosion and good resistance to oxidation in higher heat applications.

## DRIVE SHAFT OPTION:

OPTION CODE **DLO**  
LOCK-ON DRIVE SHAFT



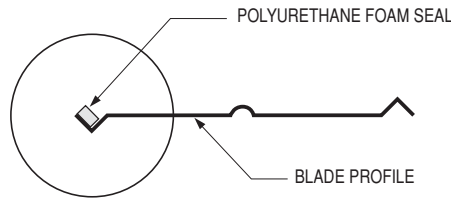
Shipped loose and can be installed before or after damper is mounted in duct. Unique spring clip locks shaft onto damper drive for firm connection. Each lock-on drive shaft is shipped complete with an outboard support bracket with bearing that can be fastened to outside of duct for extra support. Lock-on drive shafts are standard on dampers manufactured for Canada.

Note: **OPTION CODE DSR rigid drive shaft** (welded) is provided as standard on most control damper models. In Canada, **DSR** is available as an option.

## BLADE SEAL OPTION:

OPTION CODE **BSP**  
POLYURETHANE FOAM BLADE SEAL

### FOR MODELS 1012 AND 1022 ONLY

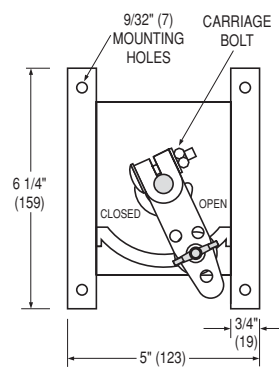


Available on Models 1012 and 1022 as an economical alternative to extruded seals, the polyurethane foam seal adheres to blade edge with self-adhesive backing. Suitable for light duty use in applications involving low static pressures and velocities.

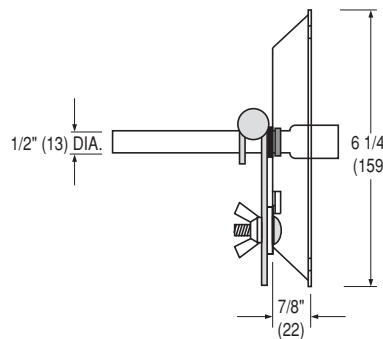
## MANUAL LOCKING QUADRANTS:

OPTION CODE **HLQ**  
HAND LOCKING QUADRANT FOR  
1/2" (13) DIA. DRIVES

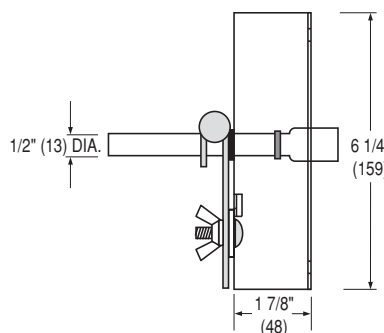
### FOR USE WITH 1/2" (13) DIA. DRIVE SHAFT



Standard hand locking quadrant designed for use with Model Series 1000, 1100, 1810/1820 and 2000 dampers. Supplied as standard with Celcon® bearing, the HLQ mounts directly over a 1/2" (13) dia. drive shaft and is secured to shaft with a carriage bolt. 16 ga. galvanized steel bracket with 1" (25) stand-off is provided for convenient installation that ensures the mounting screws do not interfere with any damper side linkage that may be hidden in damper frame. Quadrant handle and hardware are plated steel. A heavy-duty wing nut locks the quadrant in desired position.



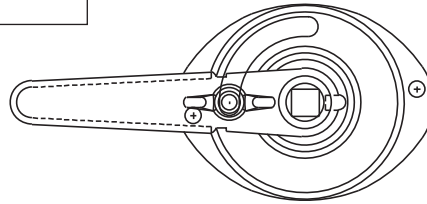
OPTION CODE **HL2**  
HAND LOCKING QUADRANT WITH  
2" (51) STAND-OFF



The HL2 hand locking quadrant is similar to the standard HLQ locking quadrant for use with 1/2" (13) dia. shafts (see above) but is supplied with a 2" (51) stand-off bracket that allows for use with externally insulated ductwork.

## MANUAL LOCKING QUADRANTS:

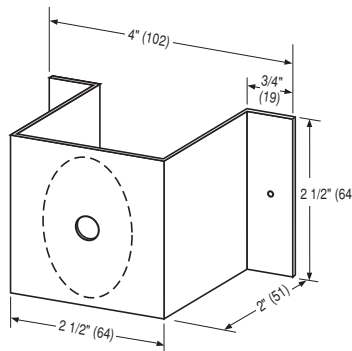
OPTION CODE **HLQ**  
HAND LOCKING QUADRANT FOR  
1/4" (6) SQUARE DRIVES



FOR USE WITH 1/4" (6) SQUARE DRIVE SHAFT

Suitable for light duty use on 1/4" (6) square drive shafts, this HLQ is supplied as standard on Models 1870 and 1890 balancing dampers. Constructed of plated steel, the quadrant slides directly over shaft and mounts easily with two mounting screws. A wing nut assembly locks the handle firmly in desired position.

OPTION CODE **SB**  
HAND LOCKING QUADRANT WITH  
2" (51) STAND-OFF BRACKET



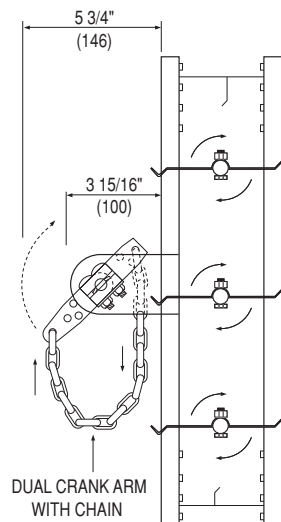
Option SB provides the above HLQ for 1/4" (6) square drive shafts with a 2" (51) stand-off bracket that allows the quadrant to be used on externally insulated ductwork.

(QUADRANT NOT SHOWN)

## MANUAL PULL-CHAIN OPERATORS:

OPTION CODE **PCE**  
EXTERNAL CHAIN OPERATOR

OPTION CODE **PCI**  
INTERNAL CHAIN OPERATOR



Nailor's manual pull-chain operator is ideal for use in applications that require remote manual operation from below a damper that is otherwise generally inaccessible. Suitable for use on Series 1000, 1100, and 2000 dampers.

**Option PCE External Pull Chain Operator** provides a dual crank arm type linkage securely fastened to a rugged jackshaft that extends past the damper frame (out of airstream). Operator can be adapted for right or left handed drive (right hand drive standard).

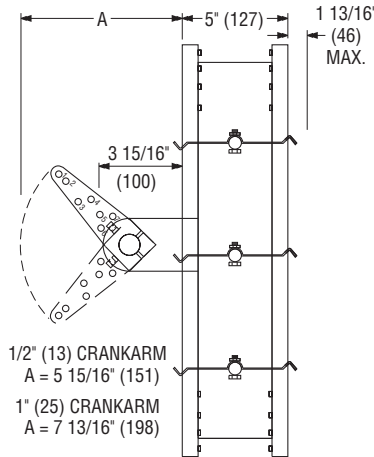
**Option PCI Internal Pull Chain Operator** provides the same strong linkage and jackshaft mounted within the face of the damper (in airstream). Units come complete with strong closed loop steel chain (please specify length) that loops down for convenient two-way operation and can be fastened to wall to maintain damper blade position. Both PCE and PCI options provide firm, smooth operation of dampers that are above the rest!

## JACKSHAFTS AND ACCESSORIES:

**OPTION CODE JK5**  
1/2" (13) DIA. JACKSHAFT

**OPTION CODE JK1**  
1" (25) DIA. JACKSHAFT

**JK5** and **JK1** jackshafting may be ordered as an option on Series 1000, 1100 and 2000 single section dampers in order to offset the mounting position of an external actuator (ie: for mounting of damper within a wall) or for internal factory mounting of an actuator (in the airstream).

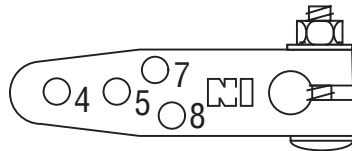


**TYPICAL JACKSHAFT**

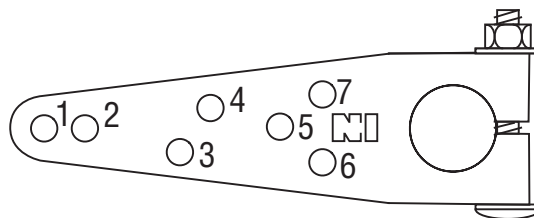


**MODEL 2020 SHOWN WITH  
OPTIONAL JK1 JACKSHAFT  
AND 1" (25) DIA. CRANK ARM**

### OPTIONAL CRANK ARM DETAILS:



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



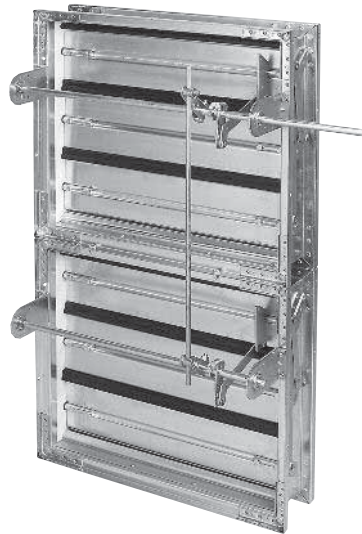
**1" (25) DIA. CRANK ARM PART NO. CD010**

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)

Other **drive accessories** such as Swivel for 5/16" (8) dia. Rod (Part No. CD006) and 1" to 3/4" (25 to 19) Jackshaft Reducer (Part No. CD075) are available. Contact your Nailor representative for assistance.

## VERTICAL INTERCONNECTION OF DAMPER SECTIONS:

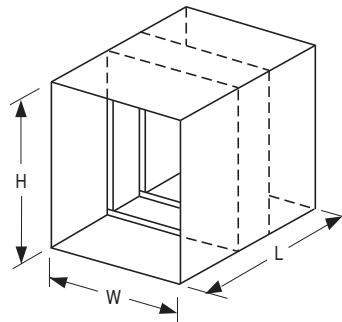
OPTION CODE **VCK**  
VERTICAL INTERCONNECTION KIT



Nailor 1000, 1100 and 2000 Series control dampers that are two sections in height (single section wide) can be connected together for operation by a single actuator by utilizing **Option VCK Vertical Inter-Connection Kit**. Standard kit consists of factory mounted 1/2" (13) diameter jackshafts on each section, with crankarms, swivels and 5/16" (8) diameter connecting rod for smooth, positive operation. Specify drive location when ordering.

## SLEEVE OPTIONS:

OPTION CODE **SL**  
SLEEVE



TYPE 'A'  
BLADES AND FRAME IN AIRSTREAM

Nailor control dampers are available in factory furnished sleeves in lengths up to 36" (914). Sleeves are constructed out of 20 ga. through 10 ga. (1.0 through 3.5) galvanized steel. When dampers are installed in factory sleeves, the "L" dimension specifies the location of damper within the sleeve. Factory furnished sleeves ensure proper fit and allow for direct shipment of dampers to jobsite eliminating the need for costly shop handling and provide for convenient, fast installation. Standard sleeve length is 12" (305) and standard "L" dimension is 4" (102).



## FACE & BYPASS MIXING DAMPERS:

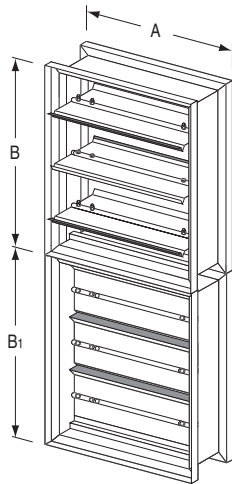
OPTION CODE **FBV**  
VERTICAL

OPTION CODE **FBH**  
HORIZONTAL

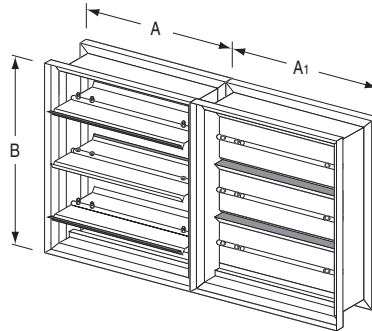
OPTION CODE **FBR**  
RIGHT ANGLE

Face and bypass dampers are standard control dampers assembled either (FBV) one over the other, (FBH) beside each other or (FBR) at right angle from each other. The units are interconnected for simultaneous blade action, typically causing one damper to open while the other closes. The Nailor FBR option utilizes an inter-connected linkage that eliminates ball joints, crank arms and connecting rods with no adjustment required. The top section is fully open when the bottom section is fully closed.

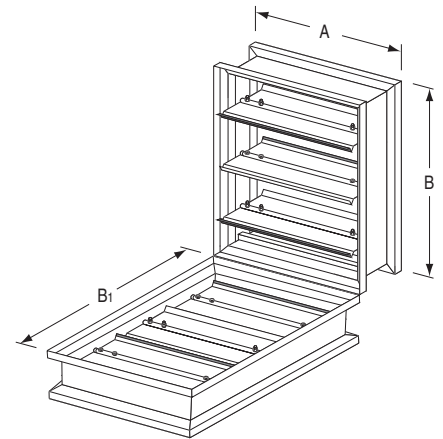
Dampers larger than maximum single section sizes are assembled of equal single section dampers (refer to the damper submittal document for maximum section sizes) and may be coupled for operation in a variety of ways. Large multiple section damper assemblies require an engineering analysis of how the dampers are to be operated (type, quantity and location of actuators) before the best method of coupling sections can be determined. Special assembly drawings are normally prepared and forwarded for customer approval on large damper assemblies.



**FBV**  
VERTICAL



**FBH**  
HORIZONTAL



**FBR**  
RIGHT ANGLE

**B**  
CONTROL DAMPERS

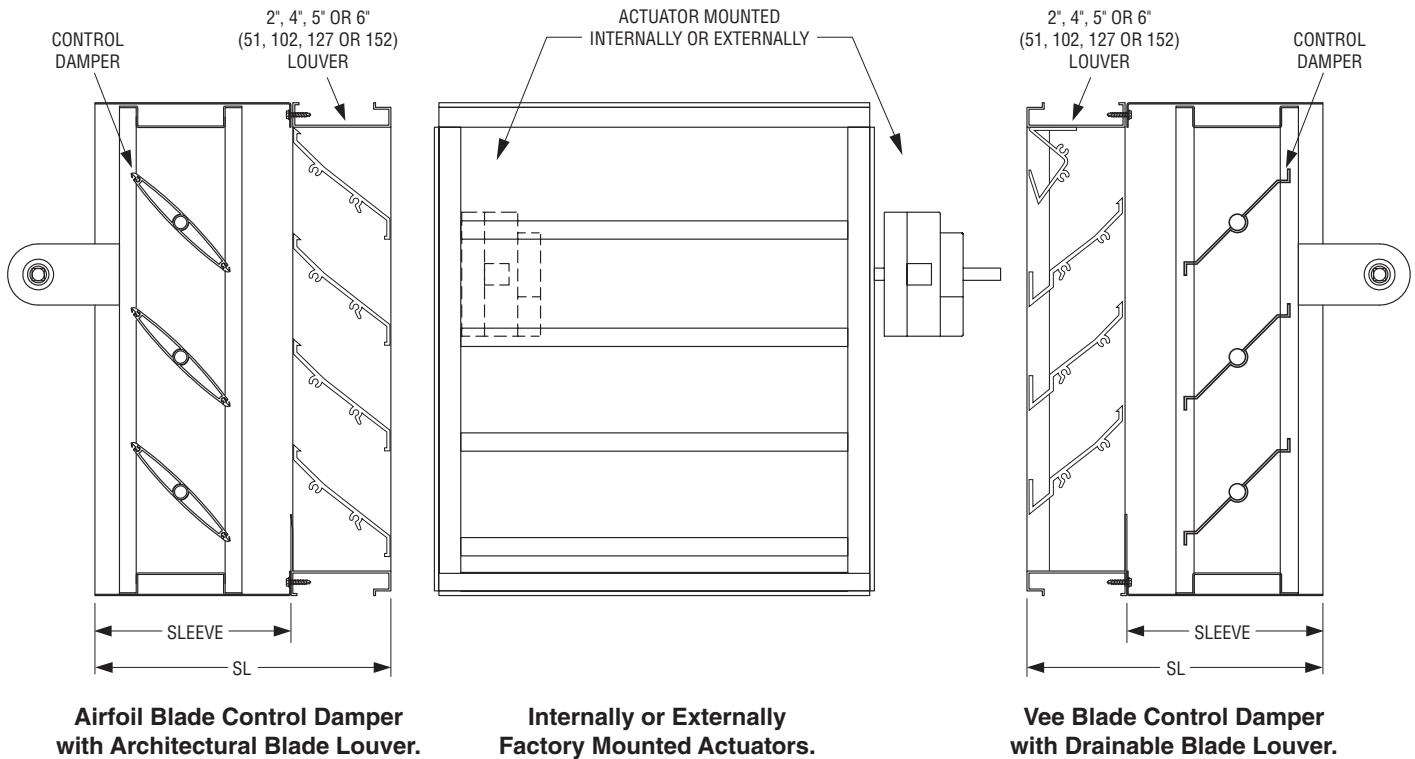
**TAKE CONTROL OF PERFORMANCE:**

## LOUVER/DAMPER COMBINATIONS IN A COMMON SLEEVE

Since 1971, Nailor Industries has been a global leader in the engineering and manufacturing of Air Control products. Our Control Damper product line features some of the industry's best performing products, with a reputation for reliability and affordability. Our Louver product line features a growing number of aesthetically pleasing and mechanically enduring models, proven to perform under the most demanding conditions.

Our capabilities as a world class manufacturer allow for an endless possibility of Control Damper and Louver combinations, suitable for just about any application or installation requirement. Using the skilled craftsmanship of Nailor's Sheet Metal Workers International Association (S.M.W.I.A) manufacturing personnel, we can construct and ship, a wide variety of Control Damper and Louver combinations, mounted in a common sleeve, ready for a fast and easy field installation. This option reduces field labor costs, materials costs, and shipping & handling costs, and offers an out of the box solution from our factory to your job site! In addition, factory mounted actuators assures proper installation and actuator selection, further reducing installation and handling costs.

**B CONTROL DAMPERS**



**Consult Nailor for specific applications and performance requirements for a custom solution today!**

## STANDARD MULTIPLE SECTION CONTROL DAMPER DRIVE ARRANGEMENTS:

Maximum single section size is 48" wide x 72" high (1219 x 1829) for all models except 2000 series which is 60" wide x 72" high (1524 x 1829). 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 "W" dimension. Maximum Section Size for all Multiple Section Dampers is 48" wide x 72" high (1219 x 1829).

**A. 1/2" (13) Diameter Jackshaft:**

- Used on two sections wide with a maximum of 32 sq. ft. with blade and jamb seals; or a maximum of 40 sq. ft. without seals.

**B. 1" (25) Diameter Jackshaft:**

- Used on two sections wide over 32 sq. ft. with blade and jamb seals; or over 40 sq. ft. without seals.

- Used on assemblies of more than two sections wide, regardless of area.

Use the details on page B50 and B51 to determine how multiple section dampers with standard construction and sizes up to 240" wide x 144" high (6086 x 3658) will be manufactured. Details do not apply if the control damper has any of the following non-standard features such as unequal section sizes or Face and Bypass arrangement. For sizes larger than 240" x 144" (6096 x 3658), consult factory.

### HOW TO DETERMINE YOUR DAMPER CONFIGURATION

1. Calculate the damper area in square feet:

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

2. Based on the W and H dimensions and the area of your damper, determine the appropriate assembly detail using the chart on page B50.

Example: Model 1020, 96" wide x 96" high.

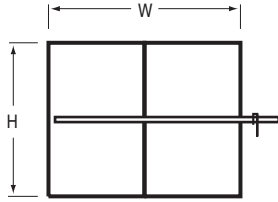
$$\text{Area} = \frac{(96 \times 96)}{144} = 64 \text{ sq. ft.}$$

From chart and drawings, damper configuration is per detail 22Q. Your damper will be built this way.

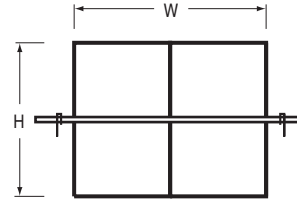
Multiple section assemblies require bracing to support the weight of the assembly and to hold against system pressure. Appropriate bracing must support the damper horizontally at least once for every 8 ft. (2438) of damper width. Vertical assemblies and higher system pressures require more bracing.

The maximum shipping size is 96" x 72" (2438 x 1829) or two sections wide. Larger units are shipped in sections for field assembly. Refer to the Control Damper Installation Instructions on pages B50 and B51 for joining multiple sections.

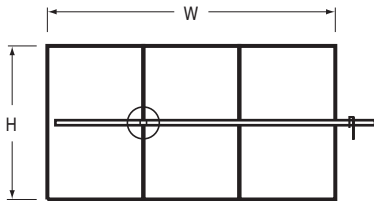
Dimension W Width in inches (mm)							
Dimension "H" Height in inches (mm) ↓	All Model Series	1000 and 1100 Series Only	2000 Series Only		All Model Series		
	48" (1219) and under	Over 48" (1219) Thru 96" (2438)	Over 48" (1219) Thru 60" (1524)	Over 60" (1524) Thru 96" (2438)	Over 96" (2438) Thru 144" (3658)	Over 144" (3658) Thru 192" (4877)	Over 192" (4877) Thru 240" (6069)
72" (1829) and under	-	Detail 21 S or D	-	Detail 21 S or D	Detail 31 S or D	Detail 41 S or D	Detail 51 S or D
Over 72" (1829) Thru 144" (3658)	Detail 12 S or D	Detail 22 S, D or Q	Detail 22 S, D or Q		Detail 32 D or Q	Detail 42 D or Q	Detail 52 S or D



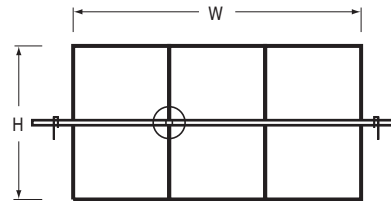
**DETAIL 21S**  
25 SQ. FT. (2.3 SQ. M) AND UNDER WITH SEALS  
48 SQ. FT. (4.5 SQ. M) AND UNDER NO SEALS



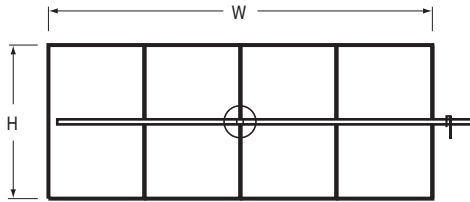
**DETAIL 21D**  
OVER 25 THRU 48 SQ. FT. (OVER 2.3 THRU 4.5 SQ. M) WITH SEALS



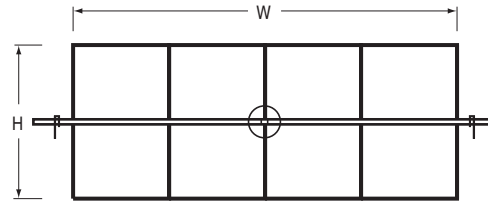
**DETAIL 31S**  
25 SQ. FT. (2.3 SQ. M) AND UNDER WITH SEALS  
50 SQ. FT. (4.6 SQ. M) AND UNDER NO SEALS



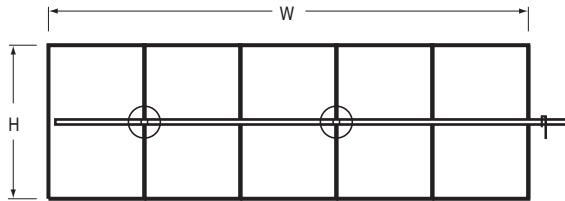
**DETAIL 31D**  
OVER 25 THRU 50 SQ. FT. (OVER 2.3 THRU 4.6 SQ. M) WITH SEALS  
OVER 50 THRU 72 SQ. FT. (OVER 4.6 THRU 6.7 SQ. M) NO SEALS



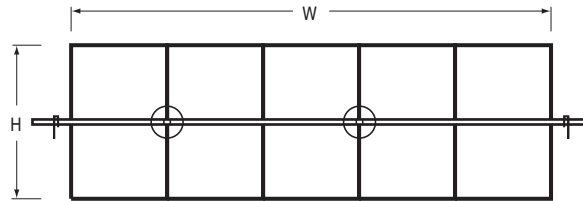
**DETAIL 41S**  
25 SQ. FT. (2.3 SQ. M) AND UNDER WITH SEALS  
50 SQ. FT. (4.6 SQ. M) AND UNDER NO SEALS



**DETAIL 41D**  
OVER 25 THRU 96 SQ. FT. (OVER 2.3 THRU 8.9 SQ. M) WITH SEALS  
OVER 50 THRU 96 SQ. FT. (OVER 4.6 THRU 8.9 SQ. M) NO SEALS

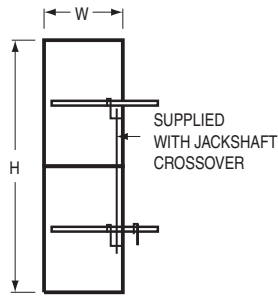


**DETAIL 51S**  
25 SQ. FT. (2.3 SQ. M) AND UNDER WITH SEALS  
50 SQ. FT. (4.6 SQ. M) AND UNDER NO SEALS

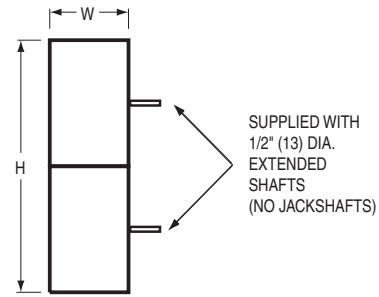


**DETAIL 51D**  
OVER 25 THRU 120 SQ. FT. (OVER 2.3 THRU 11.1 SQ. M) WITH SEALS  
OVER 50 THRU 120 SQ. FT. (OVER 4.6 THRU 11.1 SQ. M) NO SEALS

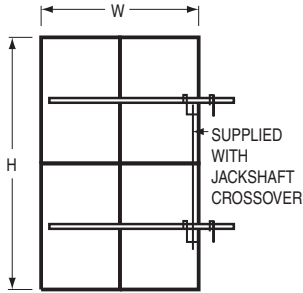
**NOTE:** INDICATES LOCATION OF JACKSHAFT COUPLING.



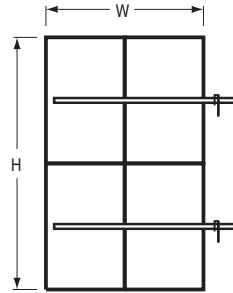
**DETAIL 12S**  
25 SQ. FT. (2.3 SQ. M) AND UNDER WITH SEALS  
48 SQ. FT. (4.5 SQ. M) AND UNDER NO SEALS



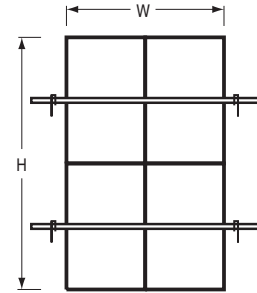
**DETAIL 12D**  
OVER 25 THRU 48 SQ. FT. (OVER 2.3 THRU 4.5 SQ. M) WITH SEALS



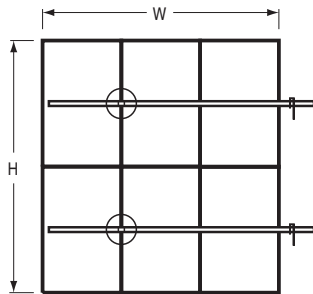
**DETAIL 22S**  
OVER 24 THRU 25 SQ. FT. (OVER 2.2 THRU 2.3 SQ. M) WITH SEALS  
OVER 24 THRU 50 SQ. FT. (OVER 2.2 THRU 4.6 SQ. M) NO SEALS



**DETAIL 22D**  
OVER 25 THRU 50 SQ. FT. (OVER 2.3 THRU 4.6 SQ. M) WITH SEALS  
OVER 50 THRU 96 SQ. FT. (OVER 4.6 THRU 8.9 SQ. M) NO SEALS

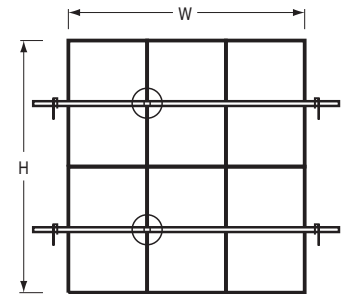


**DETAIL 22Q**  
OVER 50 THRU 96 SQ. FT. (OVER 4.6 THRU 8.9 SQ. M) WITH SEALS

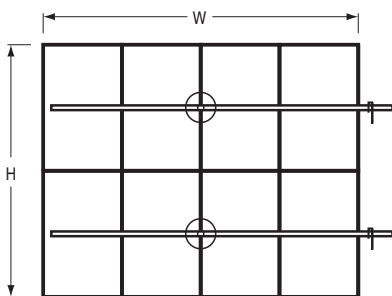


**DETAIL 32D**  
OVER 48 THRU 50 SQ. FT. (OVER 4.5 THRU 4.6 SQ. M) WITH SEALS  
OVER 48 THRU 100 SQ. FT. (OVER 4.5 THRU 9.3 SQ. M) NO SEALS

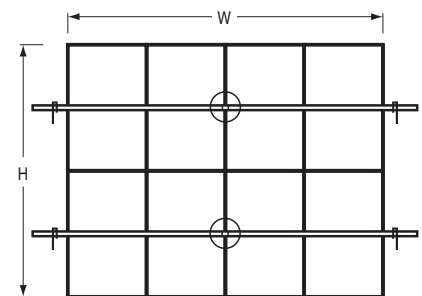
**NOTE:** INDICATES LOCATION OF JACKSHAFT COUPLING.



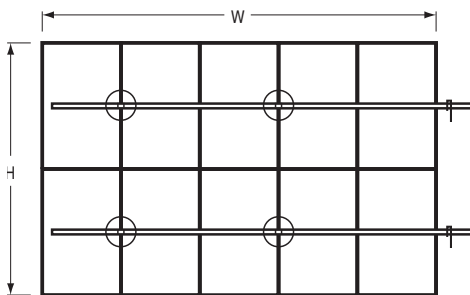
**DETAIL 32Q**  
OVER 50 THRU 144 SQ. FT. (OVER 4.6 THRU 13.4 SQ. M) WITH SEALS  
OVER 100 THRU 144 SQ. FT. (OVER 9.3 THRU 13.4 SQ. M) NO SEALS



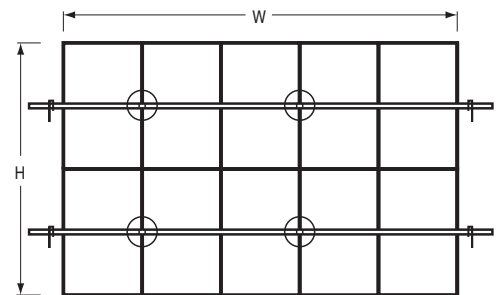
**DETAIL 42D**  
OVER 72 THRU 100 SQ. FT. (OVER 6.7 THRU 9.3 SQ. M) NO SEALS



**DETAIL 42Q**  
OVER 72 THRU 192 SQ. FT. (OVER 6.7 THRU 17.8 SQ. M) WITH SEALS  
OVER 100 THRU 192 SQ. FT. (OVER 9.3 THRU 17.8 SQ. M) NO SEALS



**DETAIL 52D**  
OVER 96 THRU 100 SQ. FT. (OVER 8.9 THRU 9.3 SQ. M) NO SEALS



**DETAIL 52Q**  
OVER 96 THRU 240 SQ. FT. (OVER 8.9 THRU 22.3 SQ. M) WITH SEALS  
OVER 100 THRU 240 SQ. FT. (OVER 9.3 THRU 22.3 SQ. M) NO SEALS