

Installation, Operation and Maintenance Manual

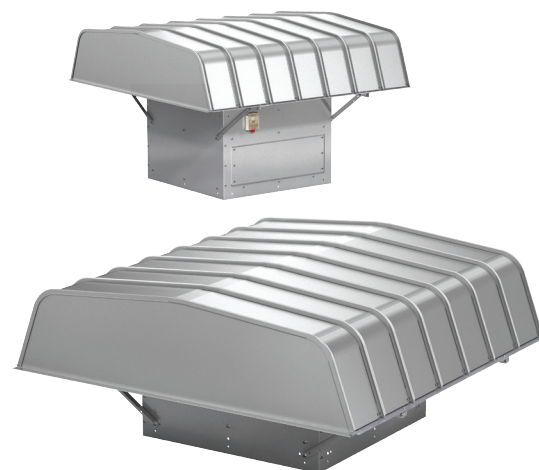
Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with these instructions will result in voiding of the product warranty and may result in personal injury and/or property damage.

Axial Hooded Exhaust, Supply and Reversible Fans

Hooded propeller roof exhaust (models RE2, RBE, RCE3 and RBCE), supply (models RS2, RBS, RCS3 and RBCS) and reversible (models RPDR and RPBR) fans include both direct- and belt-driven styles. These fans are suitable for clean air applications including factories and warehouses.

Axial Hooded Filtered Supply Fans

Optional filtered supply fans (models RBF, RBCF, RPDRF and RPBRF) include both direct- and belt-driven styles with 2-inch washable aluminum filters. These fans are suitable for applications where contaminants must be removed from supply air.



! IMPORTANT: Fans are shipped knocked down in sections, the hood and fan components can be transported to the roof location separately. Hood assembly instructions are included with the hood components. Care must be taken not to bend or distort the fan panel or drive components during installation.

! IMPORTANT: For seismic or high wind rated hoods, follow instructions starting on page 10 respectively.

General Safety Information

Only qualified personnel should install this fan. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. Other considerations may be required if high winds or seismic activity are present. If more information is needed, contact a licensed professional engineer before moving forward.

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electric Code (CEC) in Canada.
2. The rotation of the propeller is critical. It must be free to rotate without striking or rubbing any stationary objects.
3. Motor must be securely and adequately grounded.
4. Do not spin fan propeller faster than max cataloged fan RPM. Adjustments to fan speed significantly affects motor load. If the fan RPM is changed, the

motor current should be checked to make sure it is not exceeding the motor nameplate amps.

5. Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces or chemicals. Replace cord immediately if damaged.
6. Verify that the power source is compatible with the equipment.
7. Never open access doors to a duct while the fan is running.

DANGER

Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.

CAUTION

When servicing the fan, motor may be hot enough to cause pain or injury. Allow motor to cool before servicing.

CAUTION

Precaution should be taken in explosive atmospheres.

DANGER

Pour écarter les risques d'incendie, de choc électrique ou de blessure grave, veiller à toujours débrancher, verrouiller et étiqueter la source de courant avant l'installation ou l'entretien.

ATTENTION

Lors de toute intervention sur la soufflante, le moteur peut être suffisamment chaud pour provoquer une douleur voire une blessure. Laisser le moteur refroidir avant toute maintenance.

ATTENTION

Faire preuve de précaution dans les atmosphères explosives.

Receiving

Upon receiving the product, check to ensure all items are accounted for by referencing the delivery receipt or packing list. Inspect each crate or carton for shipping damage before accepting delivery. Alert the carrier of any damage detected. The customer will make notification of damage (or shortage of items) on the delivery receipt and all copies of the bill of lading which is countersigned by the delivering carrier. If damaged, immediately contact your local representative. Any physical damage to the unit after acceptance is not the responsibility of the Manufacturer.

Unpacking

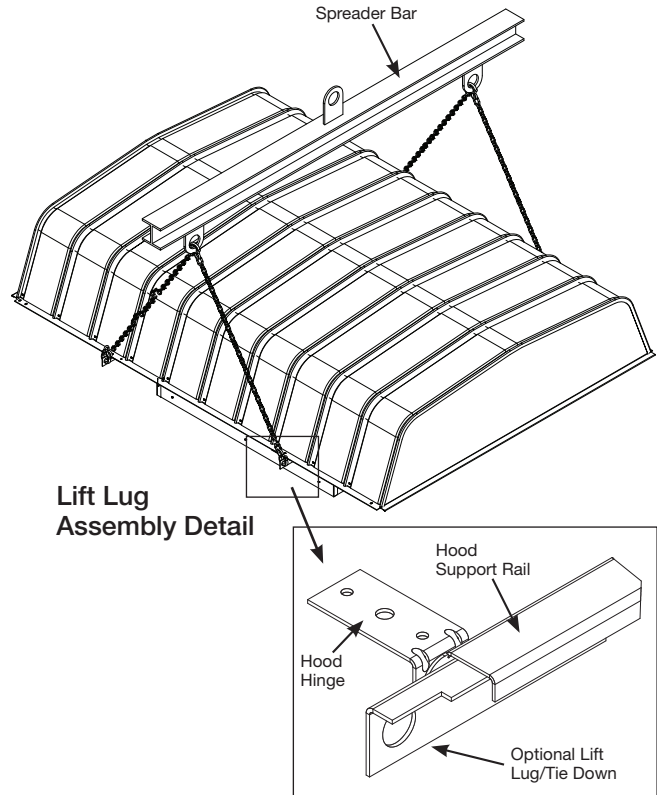
Verify that all required parts and the correct quantity of each item have been received. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts. Due to availability of transportation and truck space all items for the unit may not be shipped together. Confirmation of shipment(s) must be limited to only items on the bill of lading.

Handling

Lifting the fan must be done with care to avoid damaging the housing. Fans should never be lifted by the shaft, fan housing, motor, belt guard or accessories.

Fans are to be rigged and moved by the optional lifting brackets provided or by the skid when a forklift is used. Location of brackets varies by model and size. Handle in such a manner as to keep from scratching or chipping the coating (if applicable). Damaged finish may reduce the ability of the fan to resist corrosion. The manufacturer is not liable for any damages that may occur during this process.

NOTE: To protect fan from damage, use a spreader bar when lifting unit from overhead with straps. Manufacturer recommends using optional lift lug/tie down brackets. If lift lugs were not selected at time of order, a rigging professional must be retained for proper lifting of equipment.



Storage

Fans are protected against damage during shipment. If the unit cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the unit during storage. The user assumes responsibility of the fan and accessories while in storage. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user.

Storage Environment

The ideal environment for the storage of fans and accessories is indoors, above grade, in a low humidity atmosphere which is sealed to prevent the entry of blowing dust, rain or snow. Temperatures should be evenly maintained between 30° to 110°F (-1° to 43°C). Wide temperature swings may cause condensation and "sweating" of metal parts. All accessories must be stored indoors in a clean, dry atmosphere.

Remove any accumulations of dirt, water, ice or snow and wipe dry before moving to indoor storage. To avoid "sweating" of metal parts, allow cold parts to reach room temperature. To dry parts and packages, use a portable electric heater to get rid of any moisture build up. Leave coverings loose to permit air circulation and to allow for periodic inspection.

The unit should be stored at least 3-1/2 inches off the floor on wooden blocks covered with moisture proof paper or polyethylene sheathing. Aisles between parts and along all walls should be provided to permit air circulation and space for inspection.

Fans designed for outdoor applications may be stored outdoors, if absolutely necessary, but they must be completely assembled prior to the storage period. Roads or aisles for portable cranes and hauling equipment are needed. The fan should be placed on a level surface to prevent water from leaking into the fan. The fan should be elevated on an adequate number of wooden blocks so that it is above water and snow levels and has enough blocking to prevent it from settling into soft ground. Locate parts far enough apart to permit air circulation, sunlight and space for periodic inspection. To minimize water accumulation, place all fan parts on blocking supports so that rain water will run off.

Do not cover parts with plastic film or tarps as these cause condensation of moisture from the air passing through heating and cooling cycles.

Fan propellers should be blocked to prevent spinning caused by strong winds.

Inspection and Maintenance During Storage

While in storage, inspect fans once per month. Keep a record of inspection and maintenance performed.

If moisture or dirt accumulations are found on parts, the source should be located and eliminated. At each inspection, rotate the prop by hand ten to fifteen revolutions to distribute lubricant in motor and bearings. If paint deterioration begins, consideration should be given to touch-up or repainting. Fans with special coatings may require special techniques for touch-up or repair.

Machined parts coated with rust preventive should be restored to good condition promptly if signs of rust occur. Immediately remove the original rust preventive coating with petroleum solvent and clean with lint-free cloths. Polish any remaining rust from surface with crocus cloth or fine emery paper and oil. Do not destroy the continuity of the surfaces. Thoroughly wipe clean with Tectyl® 506 (Ashland Inc.) or the equivalent. For hard to reach internal surfaces or for occasional use, consider using Tectyl® 511M Rust Preventive, WD-40® or the equivalent.

Removing From Storage

As fans are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion until the fan equipment goes into operation.

Assembly – Exhaust and Supply, Birdscreen

Step 1 – Unpack and Inspect Parts

Parts List	Exhaust / Supply Fans									
	Fan Size / Quantity of Parts per Fan Size									
Parts Description	18	20	24	30	36	42	48	54	60	72
Fan Base Assembly	1	1	1	1	1	1	1	1	1	1
Hood Support Rail Assembly	2	2	2	2	2	2	2	2	2	2
Long Birdscreen Section	2	2	2	2	2	2	2	2	2	2
Short Birdscreen Section	2	2	2	2	2	2	2	2	2	2
Hood Rail	2	2	2	2	2	2	2	2	2	2
Hood End Panel 1 Male and 1 Female	2	2	2	2	2	2	2	2	2	2
Hood Panel	2	2	3	4	5	6	7	7	8	9
Hood Clips for sizes 54 - 72	–	–	–	–	–	–	–	22	22	22

Tools Required

- Drill
- 3/8, 7/16, 1/2 and 9/16 inch wrenches and sockets
- 5/16 inch nut runner bit for drill
- Rubber mallet
- Awl for hole alignment

IMPORTANT: It is recommended that a two person crew minimum be used for fan/hood assembly.

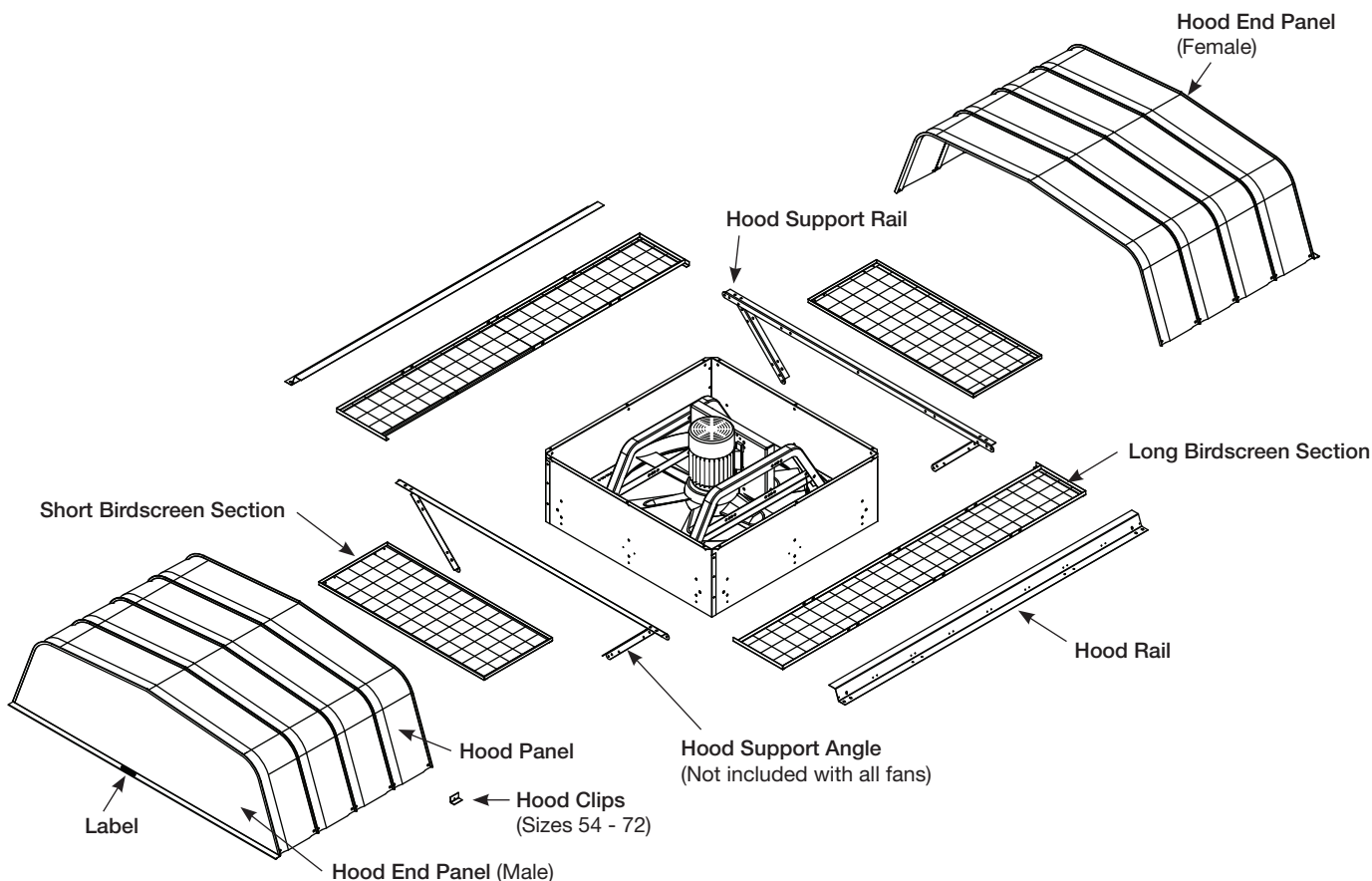
Each fan that is shipped knocked down has the following hardware package containing:

Part #816529 - Hardware Package			
	Qty.	Size	Type
Part #816526	16	3/8 - 16 x 3/4	Spinlock Bolts
Hood Support Fasteners	12	#3/8 - 16	Spinlock Nuts
Part #816527	70	#12 x 3/8	Sheet Metal Screws with Washer
Hood Fasteners	4	3/8 - 16 x 1-1/2	Spinlock Bolts
	4	#3/8 - 16	Spinlock Nuts
Part #816528	26	5/16 - 18 x 3/4	Welded Stud Bolts
Birdscreen/Filter Fasteners	26	5/16 - 18	Spinlock Nuts
	4	#12 x 3/4	Self-Drilling Screws with Washer

Note: Hardware package is designed for the filtered 72 inch fan. When used on smaller sizes there will be some fasteners left over.

ROOF CURB NOTE

Follow roof curb manufacturer's recommended installation instructions for mounting the roof curb to roof surface. Be sure to secure fan to roof curb by using pre-existing holes in fan base assembly as a guide. Use fasteners of approximately the same size as pre-existing holes designed to function with curb structural material. Mounting hardware supplied by others. For seismic or high wind curb installations, see instructions on page 10, 14 or 15 respectively.



Step 2 – Fasten Hood Support Rails

Hardware Required:

- Hardware Package #816526
- 3/8 - 16 x 3/4 inch hex head spinlock bolts and nuts

Quantity:

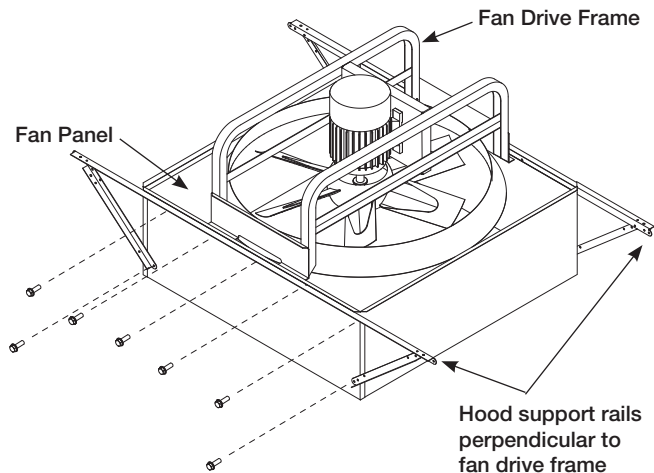
Up to (8) fasteners per side for 72 inch fans; less required for smaller sizes.

Instructions:

Wrench tighten the hood support rails to fan base assembly with rails perpendicular to fan drive frame as shown. Mounting holes in fan base assembly will line up with holes in hood support rails.

Belt and Direct Drive Supply Fan Models

The fan panel bolts are also used for the hood support rails. Remove fan panel bolts (one side at a time) and reinstall through the hood support rails.



Step 3 – Install Birdscreen Sections

Hardware Required:

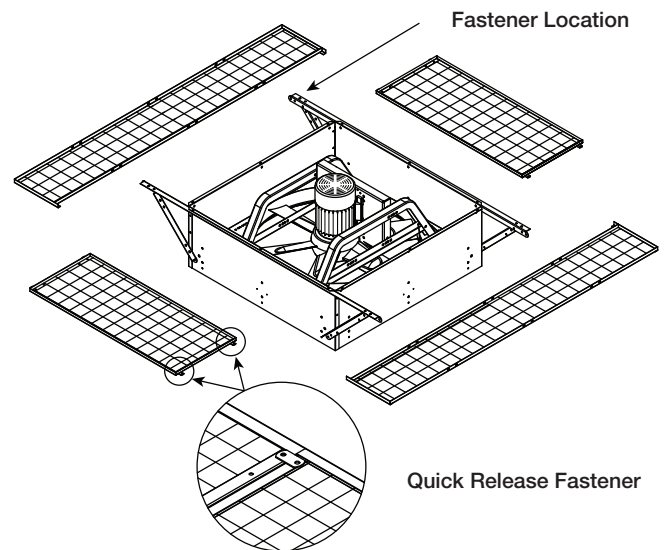
- Hardware Package #816528
- 5/16 - 18 x 3/4 inch welded stud bolts and spinlock nuts

Quantity:

Only 10 sets required of the 26 sets provided

Instructions:

1. Finger tighten the long birdscreen sections to the hood support rails at the locations indicated using the 10 sets of fasteners.
2. Lay the short birdscreen sections in place and rotate the quick release fasteners on the underside of the birdscreen to secure.



Step 4 – Install Hood Rails

Hardware Required:

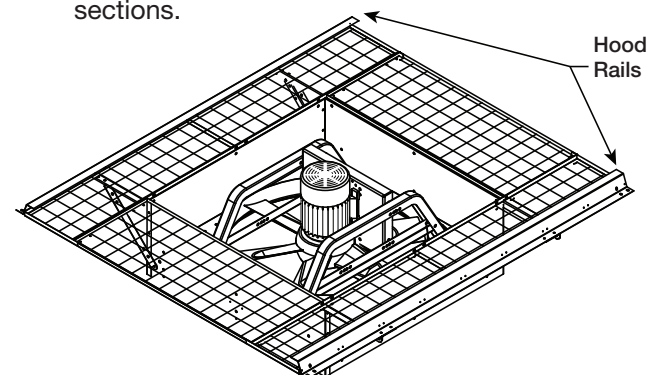
- Hardware Package #816527
- 3/8 - 16 x 1-1/2 inch hex head spinlock bolts and nuts

Quantity:

4 sets of hardware

Instructions:

1. Position the 2 hood rails as shown and finger tighten the fasteners. These fasteners will be wrench tightened in Step 5D after the hood panels are installed and secured.
2. Wrench tighten the fasteners in the long birdscreen sections.



Step 5 – Install Hood Panels

Hardware Required:

- Hardware Package #816527
- #12 x 3/8 inch sheet metal screws with washers

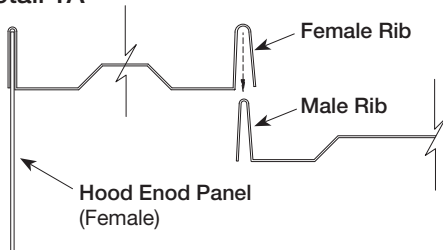
Quantity:

70 pieces required for 72 inch fan; less required for smaller sizes

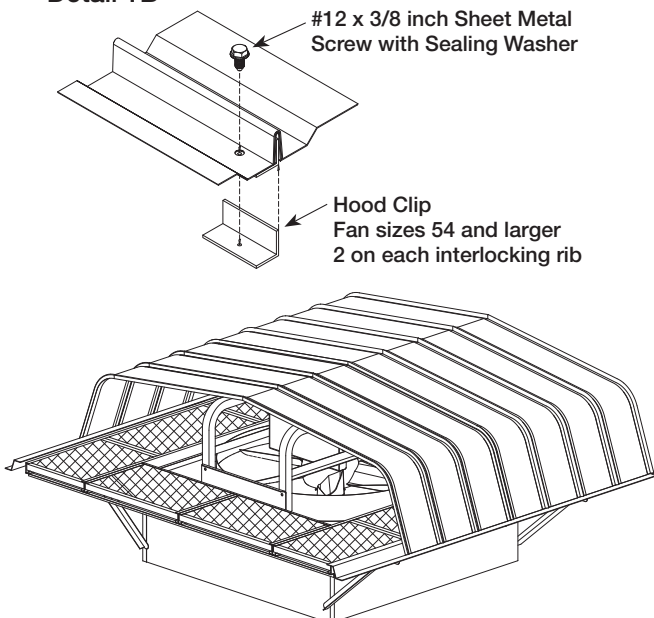
Instructions:

- Locate the male hood end panel. This is the starter panel. Place this panel on the hood rails and fasten tight with 4 screws.
- Install the intermediate hood panels one at a time. The panels have interlocking ribs (see Detail 1A). For fan sizes 54 and larger, hood clips must also be installed on each panel. Each panel is predrilled for hood clip installation (see Detail 1B). Secure each hood clip with a screw and secure each intermediate hood panel to the hood rails with 4 screws.
- Install the female hood end panel. Secure this panel to the hood rails with 4 screws. To install the hood clips, remove the short birdscreen section by loosening the quick release fasteners to gain access to the underside of the hood. Reinstall the end birdscreen after hood clips are installed.
- Wrench tighten the 4 bolts that secure the hood rails to the hood support rails.

Detail 1A



Detail 1B



Step 6 – Secure Hood and Birdscreen (Sizes 54 - 72 only)

Hardware Required:

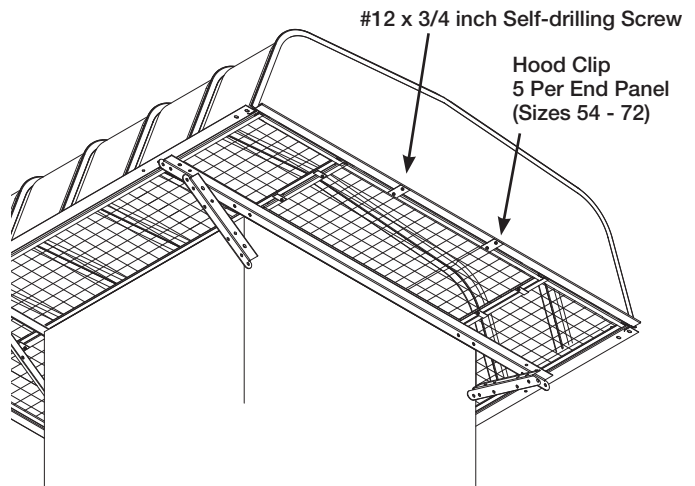
- Hardware Package #816528
- #12 x 3/4 inch self-drilling screws with washers

Quantity:

4 pieces. 2 required per hood; 2 extras

Instructions:

- With birdscreen and hood installed, locate the birdscreen clips (5 per hood end panel). Loosen the fasteners and rotate them 90° so that they support the birdscreen. Retighten fasteners.
- Locate the center birdscreen clip on each hood end panel. Push hood end panel against birdscreen. Install the #12 x 3/4 inch self-drilling screw with washer (1 per end panel) through birdscreen clip into birdscreen frame. See Detail 2.



Detail 2

Assembly – Filtered Supply

Step 1 – Unpack and Inspect Parts

Parts List	Filtered Supply Fans								
	Fan Size / Quantity of Parts per Fan Size								
Parts Description	20	24	30	36	42	48	54	60	72
Fan Base Assembly	1	1	1	1	1	1	1	1	1
Hood Support Rail Assembly	2	2	2	2	2	2	2	2	2
Outer Filter Channel	2	2	2	2	2	2	2	2	2
Inner Filter Channel	2	2	2	2	2	2	2	2	2
Filter End Channel	2	2	2	2	2	2	2	4	4
Filter Retaining Angle	2	2	2	2	2	2	2	2	2
Filter End Angle	2	2	2	2	2	2	2	2	2
End Filter	4	4	4	4	4	4	4	6	6
Side Filter	8	8	8	8	8	8	8	10	10
Hood Rail	2	2	2	2	2	2	2	2	2
Hood End Panel 1 Male and 1 Female	2	2	2	2	2	2	2	2	2
Hood Panel	2	3	5	5	6	7	8	9	10
Hood Clips for sizes 48 - 72	–	–	–	–	–	22	22	22	22

Tools Required

- Drill
- 3/8, 7/16, 1/2 and 9/16 inch wrenches and sockets
- 5/16 inch nut runner bit for drill
- Rubber mallet
- Awl for hole alignment

IMPORTANT: It is recommended that a two person crew minimum be used for fan/hood assembly.

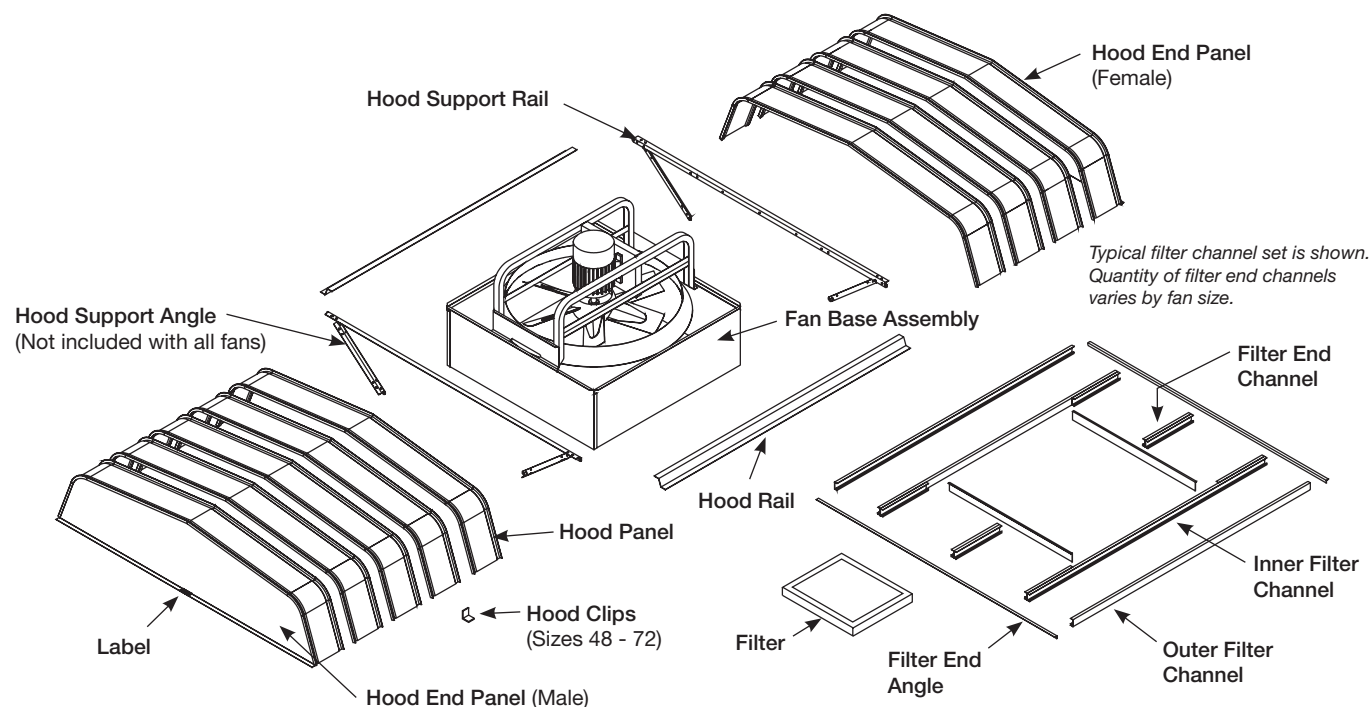
Each fan that is shipped knocked down has the following hardware package containing:

Part #816529 - Hardware Package			
	Qty.	Size	Type
Part #816526 Hood Support Fasteners	16	3/8 - 16 x 3/4	Spinlock Bolts
	12	3/8 - 16	Spinlock Nuts
Part #816527 Hood Fasteners	70	12 x 3/8	Sheet Metal Screws with Washer
	4	3/8 - 16 x 1-1/2	Spinlock Bolts
	4	3/8 - 16	Spinlock Nuts
Part #816528 Birdscreen/ Filter Fasteners	26	5/16 - 18 x 3/4	Welded Stud Bolts
	26	5/16 - 18	Spinlock Nuts
	4	#12 x 3/4	Self-Drilling Screws with Washer

Note: Hardware package is designed for the filtered 72 inch fan. When used on smaller sizes there will be some fasteners left over.

ROOF CURB NOTE

Follow roof curb manufacturer's recommended installation instructions for mounting the roof curb to roof surface. Be sure to secure fan to roof curb by using pre-existing holes in fan base assembly as a guide. Use fasteners of approximately the same size as preexisting holes designed to function with curb structural material. Mounting hardware supplied by others. For seismic or high wind curb installations, see instructions on page 10, 14 or 15 respectively.



Step 2 – Fasten Hood Support Rails

Hardware Required:

- Hardware Package Part Number 816526
- 3/8 - 16 x 3/4 inch hex head spinlock bolts and nuts

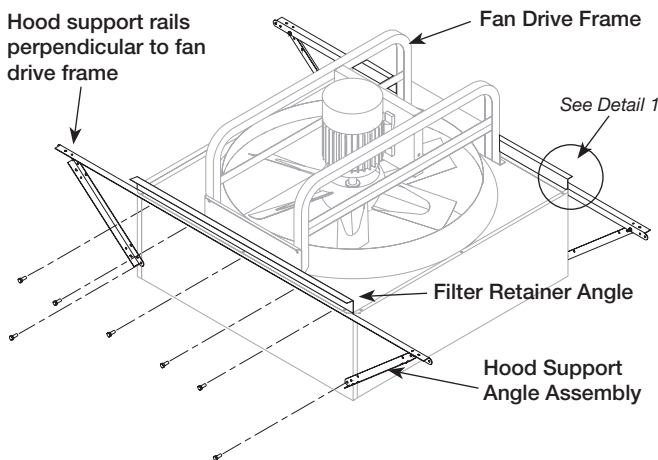
Quantity:

Up to 8 fasteners per side for 72 inch fans; less required for smaller sizes.

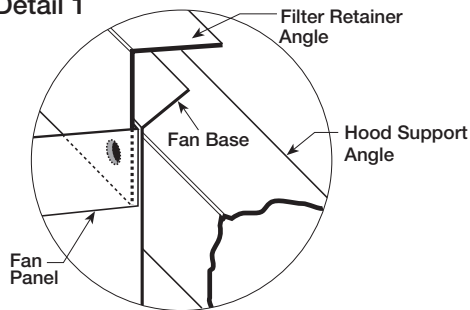
Instructions:

The bolts that fasten the fan panel to the base assembly will also be used to secure the hood support rails and filter retaining angles. (See Detail 1).

- Remove the 3/8 - 16 x 3/4 inch bolts from ONE SIDE of the fan panel (up to 6 bolts for size 72).
- Assemble the parts and wrench tighten the hood support rails and filter retaining angles perpendicular to fan drive frame as shown. Mounting holes in fan base assembly will line up with holes in hood support rails and filter retaining angles.
- Repeat for opposite side.



Detail 1



Step 3 – Install Filter Channels

Hardware Required:

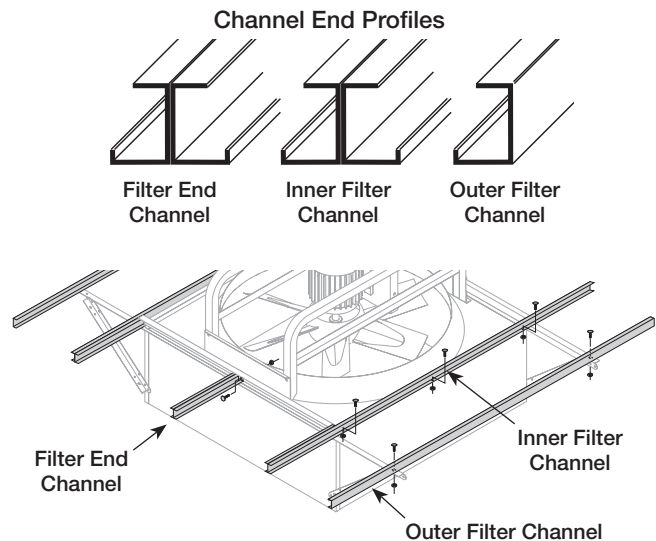
- Hardware Package Part Number 816528
- 5/16 - 18 x 3/4 inch weld studs and spinlock nuts

Quantity:

As required.

Instructions:

Finger tighten the channels in place as shown. Bolt hole locations as shown are typical, but larger units will have additional filter end channel sections. The detail below will help identify the correct channel and its proper orientation.



Step 4 – Install Filter End Angles

Hardware Required:

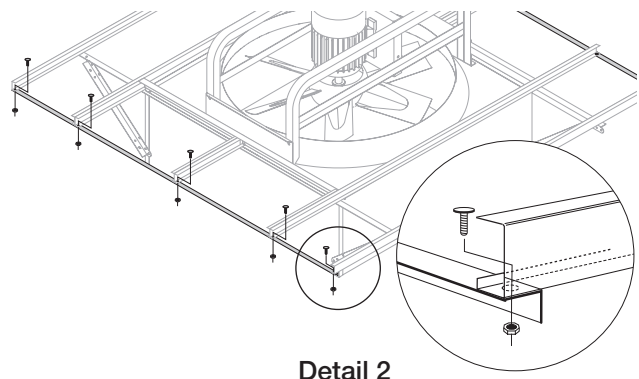
- Hardware Package Part Number 816528
- 5/16 - 18 x 3/4 inch weld studs and spinlock nuts

Quantity:

As required.

Instructions:

- Finger tighten the end angles in place as shown. Note correct position of end angle in Detail 2 with angle leg down and facing the fan base assembly. Install on both ends.
- After all filter channels and end angles are bolted together, square-up assembly, test fit a filter then wrench tighten all fasteners.



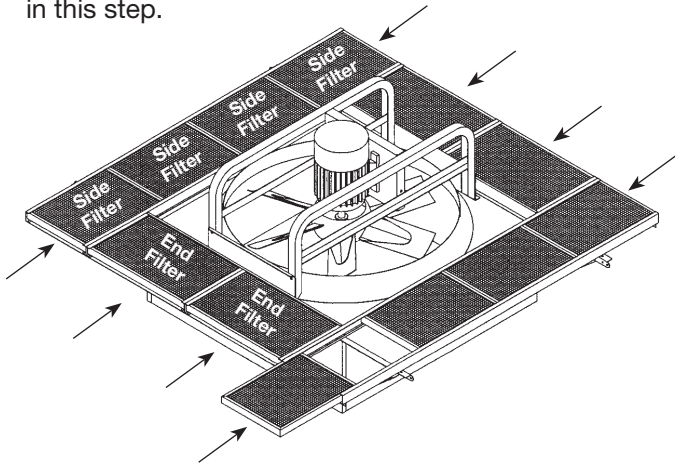
Detail 2

Step 5 – Install Filters

Instructions:

Slide filters into filter channels as indicated by the arrows.

NOTE: No fasteners or hardware are required in this step.



Step 6 – Install Hood Rails

Hardware Required:

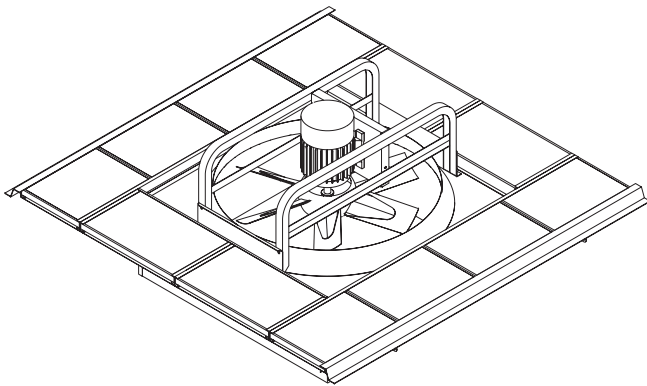
- Hardware Package Part Number 816527
- 3/8 - 16 x 1-1/2 inch hex head spinlock bolts and nuts

Quantity:

4 sets of hardware.

Instructions:

- A. Position the 2 hood rails as shown and finger tighten the fasteners. These fasteners will be wrench tightened in Step 7D after the hood panels are installed and secured.



Step 7 – Install Hood Panels

Hardware Required:

- Hardware Package Part Number 816527
- #12 x 3/8 inch sheet metal screws with washer

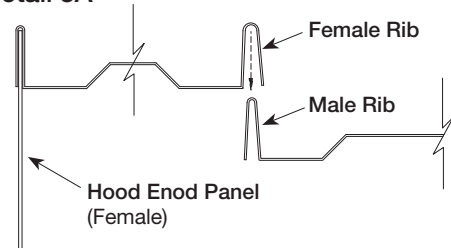
Quantity:

70 pieces required for 72 inch fan; less required for smaller sizes.

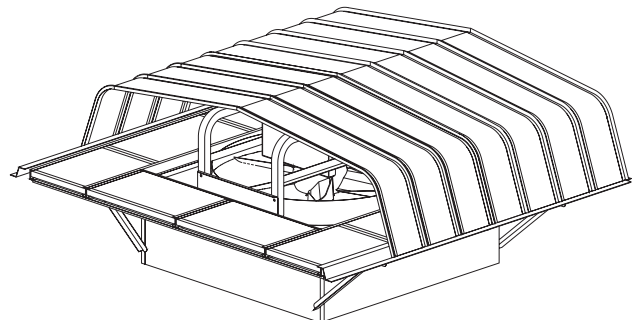
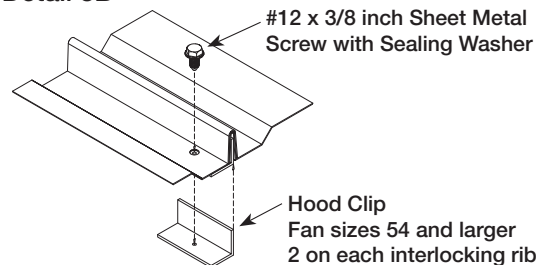
Instructions:

- A. Locate the male hood end panel. This is the starter panel. Place this panel on the hood rails and fasten tight with 4 screws.
- B. Install the intermediate hood panels one at a time. The panels have interlocking ribs (see Detail 3A). For fan sizes 48 and larger, hood clips must also be installed on each panel. Each panel is predrilled for hood clip installation (see Detail 3B). Secure each hood clip with a screw and secure each intermediate hood panel to the hood rails with 4 screws.
- C. Install the female hood end panel. Secure this panel to the hood rails with 4 screws. To install the hood clips (sizes 48 and larger), remove the end filters prior to installing and securing the female hood end panel to gain access to the underside of the hood. Reinstall the end filters after hood clips are installed.
- D. Wrench tighten the 4 bolts that secure the hood rails to the hood support rails.

Detail 3A

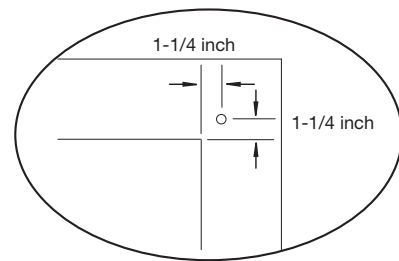


Detail 3B



Mounting for Seismic Installation

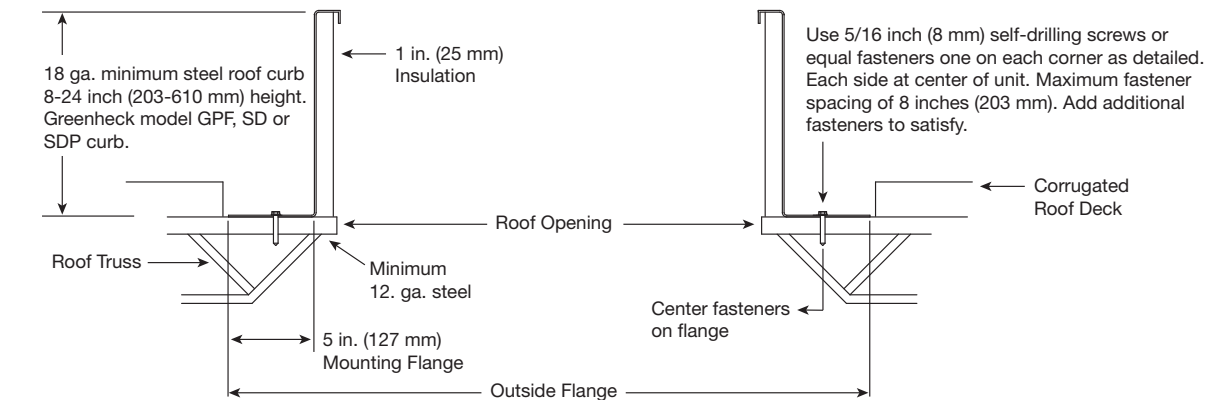
Roof Curb to Roof Deck Anchoring Requirements	Metal Building Steel Deck		Wood Deck		Concrete Deck	
Fan Size	Fasteners per side	*Total Fasteners	Fasteners per side	*Total Fasteners	Fasteners per side	*Total Fasteners
18 to 24	2	4	2	4	2	4
30 to 36	3	6	3	6	3	6
42	4	8	4	8	4	8
48 to 54	6	12	5	10	4	8
60 to 72	8	16	6	12	5	10



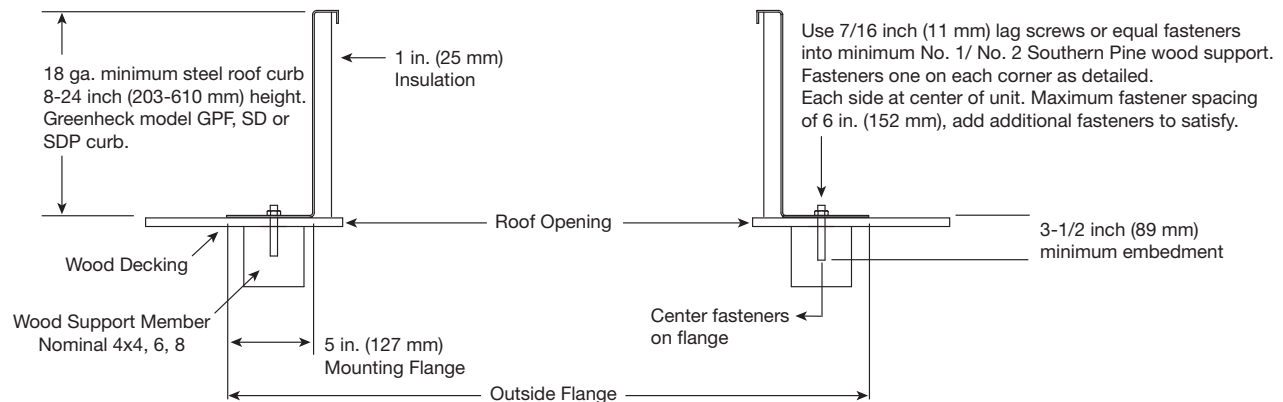
Corner Detail
Wood, Metal or Concrete

***Curb to Deck:** Fasteners required only on two opposite sides of the curb.

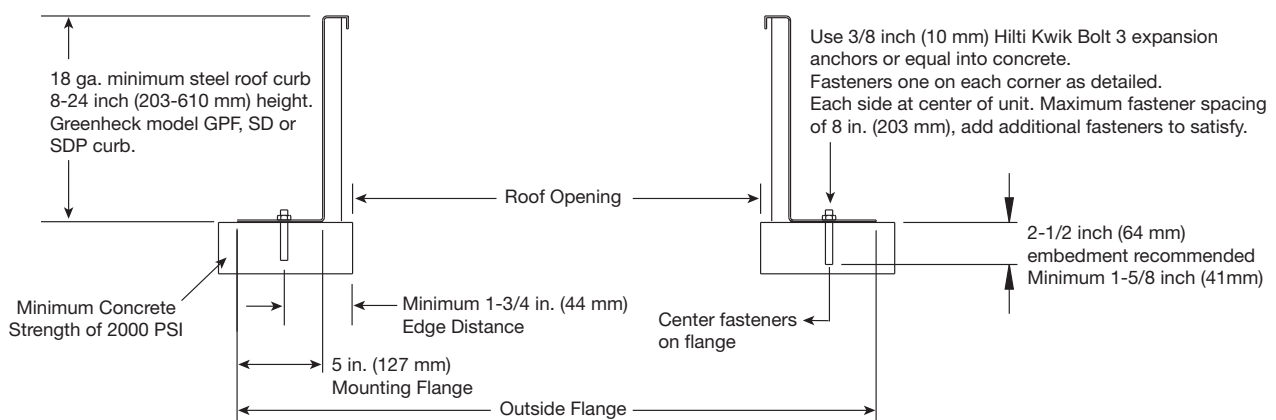
Metal Building Steel Deck



Wood Deck



Concrete Deck



High Wind and Hurricane – Hood Assembly and Installation

Step 1 – Hood Rail Assembly

NOTE: For easier assembly and lifting elevate hood rail assembly on blocks.

Lay out hood rail assembly and hood end angles, see Figure 1. Install thread cutters (hardware kit # 916687

- 5/16-18 x 1 inch) from underneath, first through hood end angles and second hood rail assembly.

NOTE: Use a builders square to ensure the corners of the frame are as close to 90° as possible.

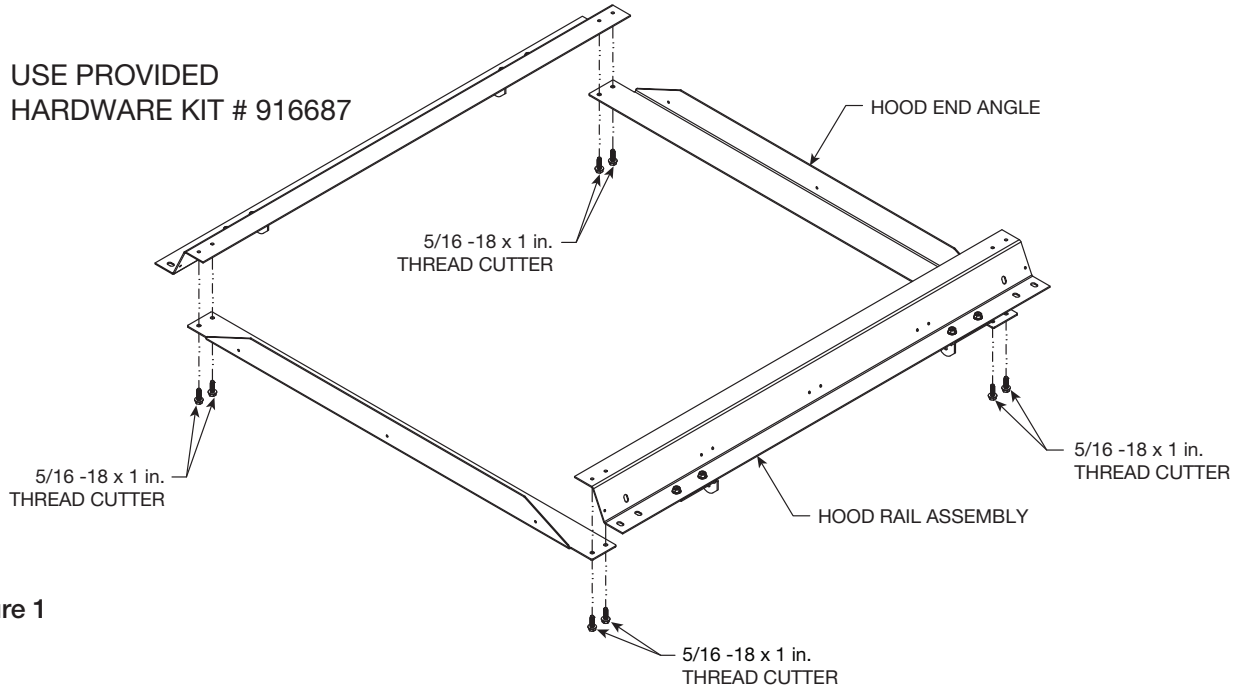


Figure 1

Step 2 – Install Hat Channel

Place diagonal end panel supports with the formed angle running the length of the part facing out and slots next to hat channel. Fasten diagonals with whiz nut (hardware kit # 917544). Leave whiz nuts snug and DO NOT tighten. Lift hat channel into place. The diagonals will support the hat channel as it is being installed. Use

thread cutters (hardware kit # 917544) to attach the hat channel to the diagonal end panel supports. Tighten whiz nuts.

NOTE: Adjustment of the hat channel may be needed. Ensure there is no more than an 1/8 inch gap between the hat channel and hood panel.

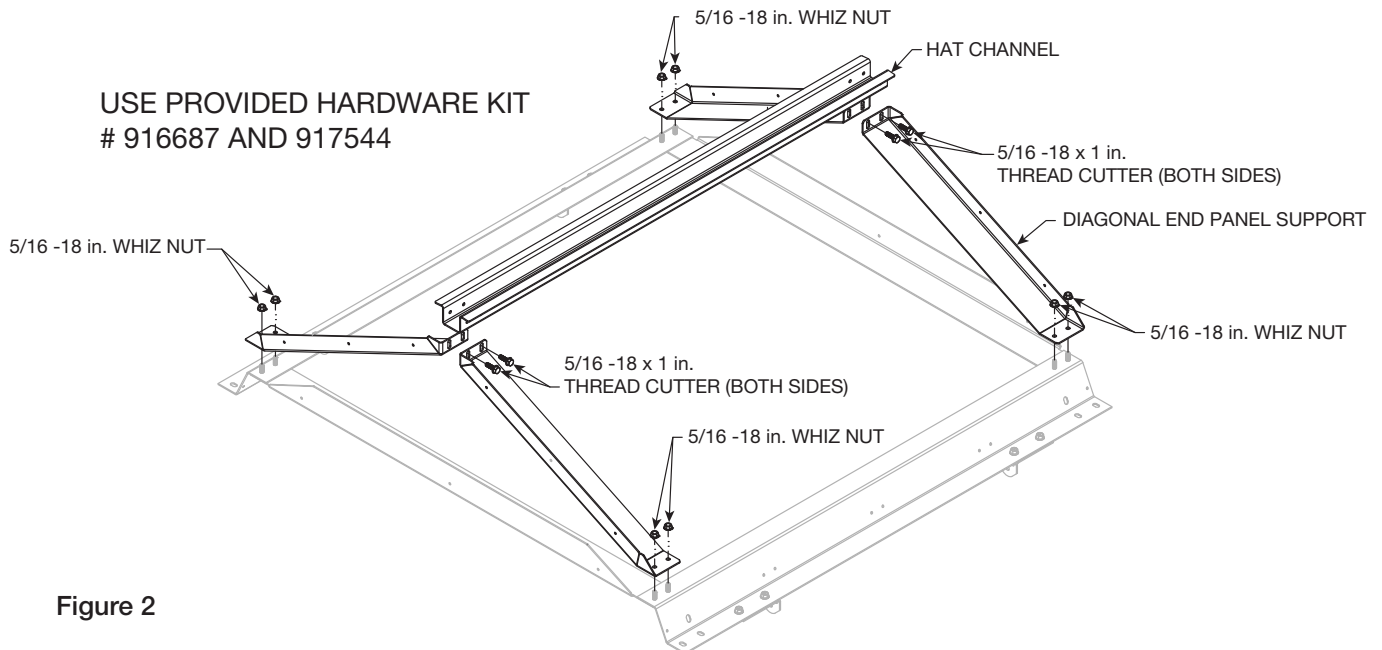


Figure 2

Step 3 – Install Hood End Panel (Male Rib)

Lift the hood end panel (male rib) into place. Use the 1/4-20 x 1 thread rolling screws with washer (hardware kit # 916688) to attach hood end panel to the diagonal end panel supports at the holes in the hood end panel that line up with holes in the diagonal end panel supports.

Use 4, #12-14 x 1 inch self-tapping screws (hardware kit # 916689) to attach the hood panel to the hat channel.
Use 4, #12-11 x 5/8 sheet metal screws (hardware kit # 916691) to attach the hood panel to the hood rail assembly.

USE PROVIDED HARDWARE KIT
916691 AND 916689

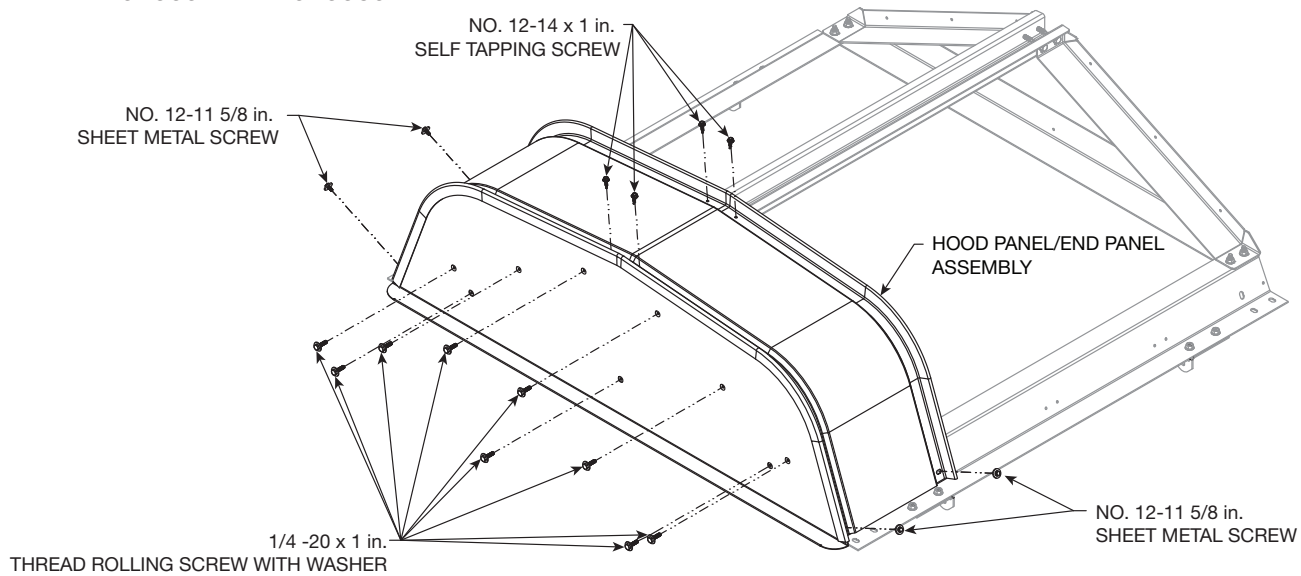


Figure 3

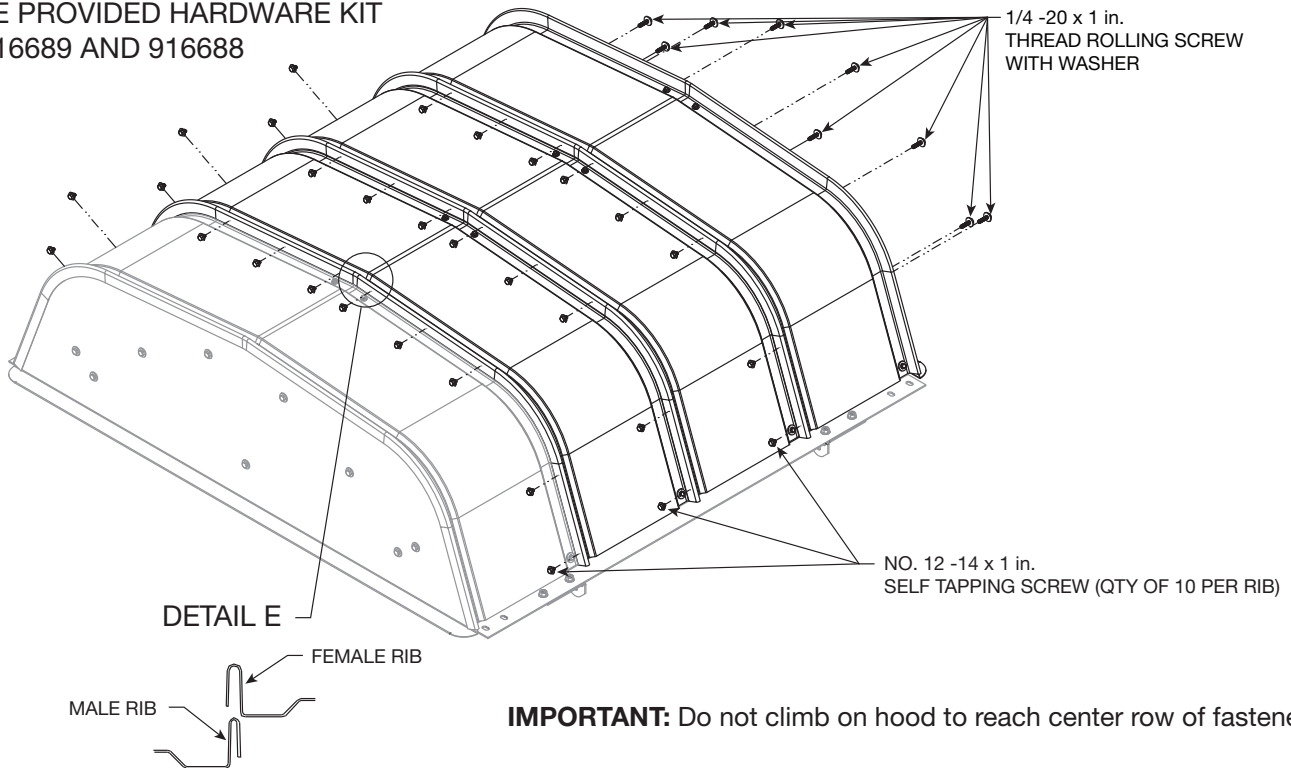
Step 4 – Install Hood Panels to Hood Rail Assembly

Place the next hood panel by interlocking each panel as shown in Figure 4, Detail E. Secure each hood panel to the hood rail assembly as it is put in place using 4, #12-14 x 1 inch self-tapping screws (hardware kit # 916689) to attach the hood panel to the hat channel. Use 4, #12-11 x 5/8 sheet metal screws (hardware kit # 916691) to attach the hood panel to the hood

rail assembly. Using quantity 10 sheet metal screws (hardware kit # 916690) with sealing washers per hood panel. Place the remaining hood panels in place with the hood end assembly with the female rib is to be installed last as shown in Step 3, page 12.

IMPORTANT: Do not drive sheet metal screws all the way through both sides of the ribs as this could allow water to leak through the hood. Screws are to fasten only the first 2 layers of the rib joint.

USE PROVIDED HARDWARE KIT
916689 AND 916688



IMPORTANT: Do not climb on hood to reach center row of fasteners.

Figure 4

Step 5 – Lift Hood Assembly onto Fan Base Assembly

Lift completed hood assembly onto the fan base assembly and attach the hood assembly to the hood support angles, using 3/8 x 3/4 inch bolt with 3/8 inch Nyloc nut at each attachment point.

Step 6 – Tighten fasteners

Tighten all pivot bracket fasteners.

NOTE: There may be extra fasteners.

Step 7 – Mounting

Only Curb to Deck: Fasteners need to be located on two opposite sides of the curb.

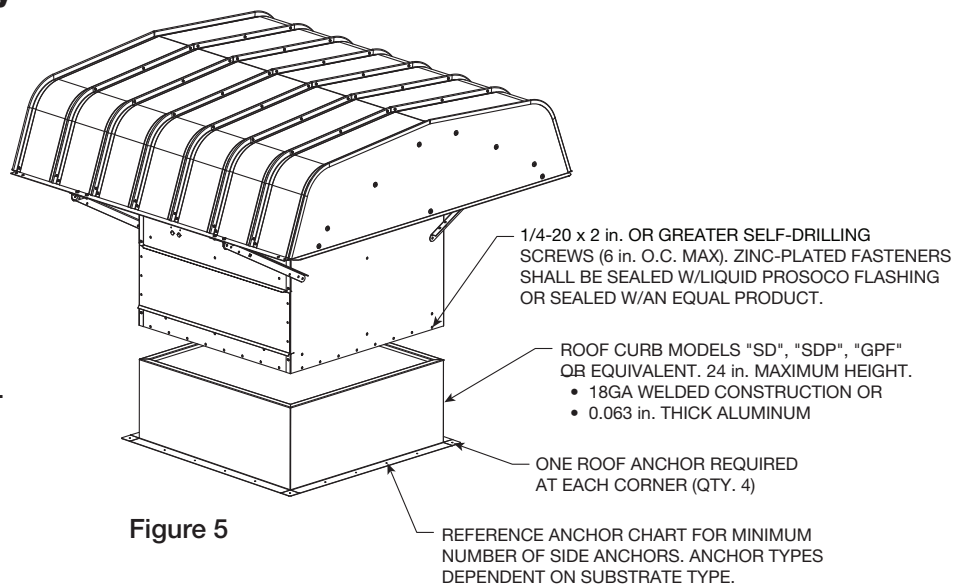


Figure 5

High Wind Rating Anchoring (Galvanized)

Fan Size	Timber Deck				Steel Deck				Concrete Deck			
	Option #1 (Lag Screws)		Option #2 (Thru Bolts)		Option #3 (Self-Drill Screws)		Option #4 (Thru Bolts)		Option #5 (Screw Anchors)		Option #6 (Thru Bolts)	
	Per Side	Total	Per Side	Total	Per Side	Total	Per Side	Total	Per Side	Total	Per Side	Total
18	1	8	0	4	0	4	0	4	0	4	0	4
20	1	8	1	8	1	8	1	8	1	8	1	8
24	1	8	1	8	1	8	1	8	1	8	1	8
30	2	12	2	12	2	12	2	12	2	12	2	12
36	2	12	2	12	2	12	3	16	2	12	3	16
42	3	16	3	16	3	16	3	16	3	16	3	16
48	4	20	4	20	4	20	4	20	4	20	4	20

¹ Unless noted, anchors to be either 300 series stainless steel cond. cw (Fy=65ksi min.) or zinc plated grade 2 steel (Fy=57ksi min.). Zinc plated anchors shall be sealed with liquid prosoco flashing (or equivalent product) unless flashing is provided.

² All anchors to be installed per the manufacturer's recommendations.

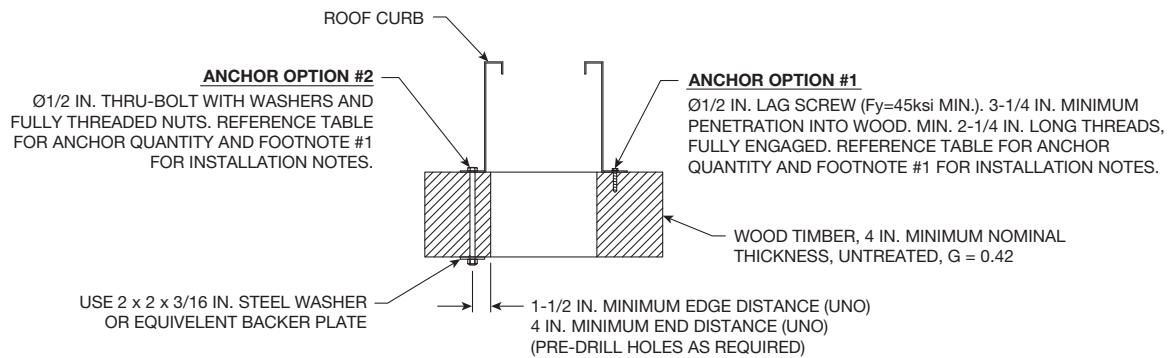
³ All anchors and substrates are by others.

⁴ Corner fasteners are not included in the above "per side" quantities. They are included in the "total" quantities.

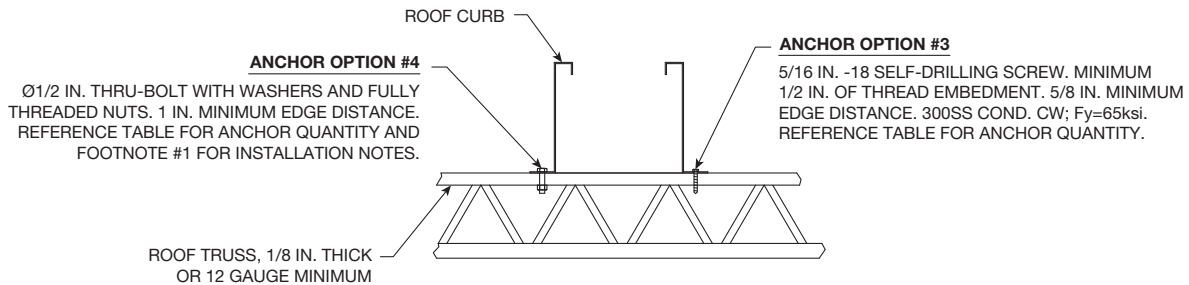
⁵ Each install is to utilize 4 corner fasteners. No exceptions.

⁶ Tabulated data generated from 70psf for galvanized units or 40psf for aluminum units. Uplift and lateral loads are applied independently.

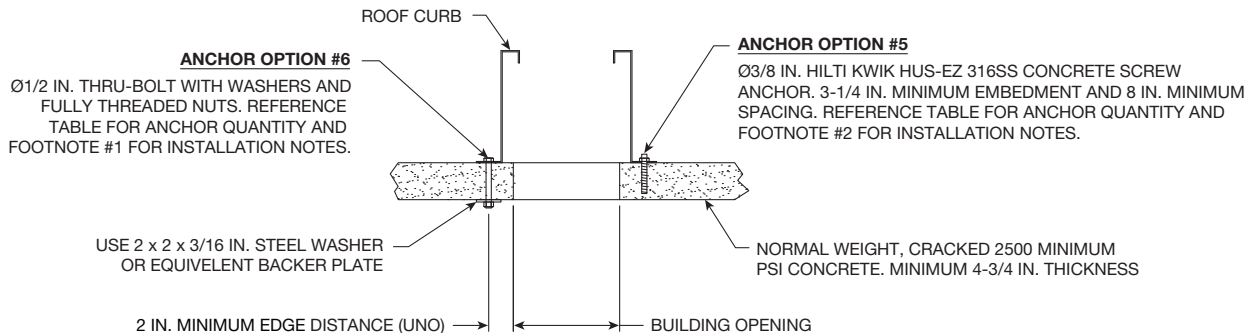
Timber Deck



Steel Deck



Concrete Deck



High Wind Rating Anchoring (Aluminum)

Fan Size	Timber Deck				Steel Deck				Concrete Deck			
	Option #1 (Lag Screws)		Option #2 (Thru Bolts)		Option #3 (Self-Drill Screws)		Option #4 (Thru Bolts)		Option #5 (Screw Anchors)		Option #6 (Thru Bolts)	
	Per Side	Total	Per Side	Total	Per Side	Total	Per Side	Total	Per Side	Total	Per Side	Total
18	0	4	0	4	0	4	0	4	0	4	0	4
20	0	4	0	4	0	4	0	4	0	4	0	4
24	1	8	1	8	1	8	1	8	1	8	1	8
30	1	8	1	8	1	8	1	8	1	8	1	8
36	2	12	2	12	2	12	2	12	2	12	2	12
42	2	12	2	12	2	12	2	12	2	12	2	12
48	3	16	3	16	3	16	3	16	3	16	3	16

¹ Unless noted, anchors to be either 300 series stainless steel cond. cw (Fy=65ksi min.) or zinc plated grade 2 steel (Fy=57ksi min.). Zinc plated anchors shall be sealed with liquid prosoco flashing (or equivalent product) unless flashing is provided.

² All anchors to be installed per the manufacturer's recommendations.

³ All anchors and substrates are by others.

⁴ Corner fasteners are not included in the above "per side" quantities. They are included in the "total" quantities.

⁵ Each install is to utilize 4) corner fasteners. No exceptions.

⁶ Tabulated data generated from 70psf for galvanized units or 40psf for aluminum units. Uplift and lateral loads are applied independently.

Timber Deck

ANCHOR OPTION #2
Ø1/2 IN. THRU-BOLT WITH WASHERS AND FULLY THREADED NUTS. REFERENCE TABLE FOR ANCHOR QUANTITY AND FOOTNOTE #1 FOR INSTALLATION NOTES.

ANCHOR OPTION #1
Ø1/2 IN. LAG SCREW (Fy=45ksi MIN.). 3-1/4 IN. MINIMUM PENETRATION INTO WOOD. MIN. 2-1/4 IN. LONG THREADS, FULLY ENGAGED. REFERENCE TABLE FOR ANCHOR QUANTITY AND FOOTNOTE #1 FOR INSTALLATION NOTES.

WOOD TIMBER, 4 IN. MINIMUM NOMINAL THICKNESS, UNTREATED, G = 0.42

USE 2 x 2 x 3/16 IN. STEEL WASHER OR EQUIVALENT BACKER PLATE

1-1/2 IN. MINIMUM EDGE DISTANCE (UNO)
4 IN. MINIMUM END DISTANCE (UNO)
(PRE-DRILL HOLES AS REQUIRED)

Steel Deck

ANCHOR OPTION #4
Ø1/2 IN. THRU-BOLT WITH WASHERS AND FULLY THREADED NUTS. 1 IN. MINIMUM EDGE DISTANCE. REFERENCE TABLE FOR ANCHOR QUANTITY AND FOOTNOTE #1 FOR INSTALLATION NOTES.

ANCHOR OPTION #3
5/16 IN. -18 SELF-DRILLING SCREW. MINIMUM 1/2 IN. OF THREAD EMBEDMENT. 5/8 IN. MINIMUM EDGE DISTANCE. 300SS COND. CW; Fy=65ksi. REFERENCE TABLE FOR ANCHOR QUANTITY.

ROOF TRUSS, 1/8 IN. THICK OR 12 GAUGE MINIMUM

Concrete Deck

ANCHOR OPTION #6
Ø1/2 IN. THRU-BOLT WITH WASHERS AND FULLY THREADED NUTS. REFERENCE TABLE FOR ANCHOR QUANTITY AND FOOTNOTE #1 FOR INSTALLATION NOTES.

ANCHOR OPTION #5
Ø3/8 IN. HILTI KWIK HUS-EZ 316SS CONCRETE SCREW ANCHOR. 3-1/4 IN. MINIMUM EMBEDMENT AND 8 IN. MINIMUM SPACING. REFERENCE TABLE FOR ANCHOR QUANTITY AND FOOTNOTE #2 FOR INSTALLATION NOTES.

USE 2 x 2 x 3/16 IN. STEEL WASHER OR EQUIVALENT BACKER PLATE

NORMAL WEIGHT, CRACKED 2500 MINIMUM PSI CONCRETE. MINIMUM 4-3/4 IN. THICKNESS

2 IN. MINIMUM EDGE DISTANCE (UNO)

BUILDING OPENING

Access to the Motor Compartment

Use caution when handling the hood in strong winds.

On fan sizes 18 to 48:

1. Remove 2 fasteners shown in Figure 6.

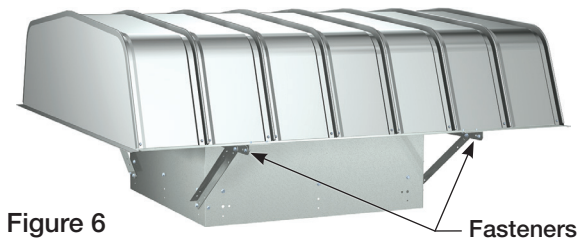


Figure 6

Fasteners

2. Carefully swing the hood 180° and let it rest on the roof. If desired, the entire hood may be removed by removing the 2 additional fasteners on the opposite side of the fan.

On fan sizes 36 to 72 access to the motor compartment can also be made by either:

- A. Removing birdscreen or filters and standing under the hood of large fans.
- B. Removing one interlocking hood end section of smaller units.

Electrical Connections

Before electrical connections are made, the supply voltage, phase and ampere capacity must be checked for compatibility with the fan motor. In addition, the supply wiring must be properly fused and conform to local and national electrical codes.

If the electrical supply is to be routed to the fan from the interior of the building, it should pass through the conduit hole in the fan panel. The supply wires are then connected to an optional safety disconnect switch (if supplied) or wired directly to the motor.

Pre-Starting Checks

Check all fasteners and set screws for tightness. This is especially important for bearing set screws.

The propeller should rotate freely and not rub on the fan panel venturi. Rotation direction of the propeller should be checked by momentarily turning the unit on. Rotation should be in the same direction as the rotation decal affixed to the unit or as shown in Figure 7.

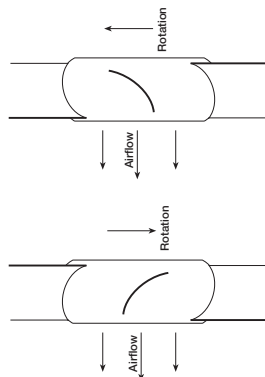


Figure 7

For three-phase installation, fan rotation can be reversed by simply interchanging any two of the three electrical leads. For single phase installations, follow the wiring diagram located on the motor.

For Belt Drive Fans

Greenheck offers either constant or adjustable speed drives for fan speed adjustments. The drive systems are preset at the factory for the specified fan RPM.

For belt drive units provided with an adjustable motor pulley, fan speeds can be increased or decreased by adjusting the pitch diameter of the motor pulley. Multi-groove adjustable motor pulleys must be adjusted an equal number of turns open or closed. Always check the motor amperage reading and compare it to the amperage rating shown on the motor nameplate when changing fan RPM.

Routine Maintenance

DANGER

Disconnect and secure to the "off" position all electrical power to the fan prior to inspection or servicing. Failure to comply with this safety precaution could result in serious injury or death.

DANGER

Pour écarter les risques de blessure grave ou de mort, débrancher et verrouiller l'alimentation électrique en position « Arrêt » avant tout contrôle ou entretien.

Once the fan has been put into operation, a periodic maintenance program should be set up to preserve the reliability and performance of the fan. Items to be included in this program are:

Belts

Premature belt failures are frequently caused by improper belt tension (either too tight or too loose) or misaligned pulleys. The proper tension for operating a V-belt is the lowest tension at which the belts will not slip at peak load conditions. For initial tensioning, the proper belt deflection half way between pulley centers

is 1/64 inch for each inch of belt span. For example, if the belt span is 64 inches, the belt deflection should be 1 inch using moderate thumb pressure at midpoint of the drive (Figure 8).

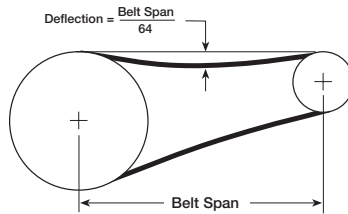


Figure 8

Check belt tension two times during the first 24 hours of operation and periodically thereafter. To adjust belt tension, simply loosen 4 fasteners (2 on each side of the motor plate) and slide the motor plate away from the fan shaft until proper belt tension is attained. On some fans, fasteners attaching the motor to the motor plate must be loosened in order to adjust the belt.

It is very important that the drive pulleys remain in proper alignment after adjustments are made. Misalignment of pulleys will result in premature belt wear, noise, vibration and power loss. See Figure 9.

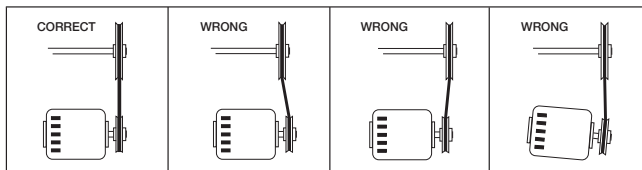


Figure 9

Bearings (Belt Drive Fans Only)

Bearings are the most critical moving part of the fan and should be inspected at periodic intervals. Locking collars and set screws, in addition to fasteners attaching the bearings to the bearing plate, must be checked for tightness. In a clean environment and temperatures above 32°F/below 200°F, fan shaft bearings with grease fittings should be lubricated semi-annually using a high quality lithium based grease. If unusual environmental conditions exist temperatures below 32°F/above 200°F, moisture or contaminants, more frequent lubrication is required.

With the unit running, add grease very slowly with a manual grease gun until a slight bead of grease forms at the seal. Be careful not to unseat the seal by over lubricating or using excessive pressure. Bearings without grease fittings are lubricated for life.

Fasteners and Set Screws

Any fan vibration has a tendency to loosen mechanical fasteners. A periodic inspection should include checking all fasteners and set screws for tightness. Particular attention should be paid to set screws attaching the propeller to the shaft and the shaft to the bearings. Loose bearing set screws will lead to premature failure of the fan shaft.

Lubrication

Refer to the paragraph on bearings for bearing lubrication. Many fractional horsepower motors installed on the smaller fans are lubricated for life and require no further attention. Motors equipped with oil holes should be oiled in accordance with the manufacturer's

instructions printed on the motor. Use a high grade SAE 20 machine oil and use caution not to over lubricate. Motors supplied with grease fittings should be greased according to directions printed on the motor.

Removal of Dust and Dirt

Dirt clogs cooling openings on the motor housing, contaminates bearing lubricant and collects on propeller blades causing severe imbalance if left unchecked. The exterior surface of the motor, fan panel and entire propeller should be thoroughly cleaned periodically. Use caution and do not allow water or solvents to enter the motor or bearings. Under no circumstances should motors or bearings be sprayed with steam or water.

Damper Inspection and Service

If an optional tall base with damper is supplied, access to the optional damper(s) and actuator(s) is provided by a removable door. Simply release the two cam latches and slide the damper out for inspection, cleaning or service.

For fan sizes 24 through 36 supplied without a tall base, the entire unit must be lifted off the roof curb for access to the damper.

For fan sizes 42 through 72 supplied without a tall base, access to the damper is made by removing one end of the birdscreen or filters and working on the damper from above.

Refer to **WARNING** at the beginning of the **Routine Maintenance** section.

Filter Maintenance (Filtered Supply Fans)

Aluminum mesh filters should be cleaned on a regular basis for optimum fan efficiency. The frequency of cleaning depends upon the cleanliness of the incoming air.

To remove filters on fan sizes 24 to 30, first remove the hood as described in **Access to the Motor Compartment** section. The filters can then be pulled from the slide-out racks. See Figure 10. On fan sizes 36 to 72, access panels on the end panels are provided which allow the filters to be removed without removing the hood.

Filters should be washed with a mild detergent in warm water. After the filters are dry, an adhesive spray available at most filter distributors may be applied to increase filter efficiency.

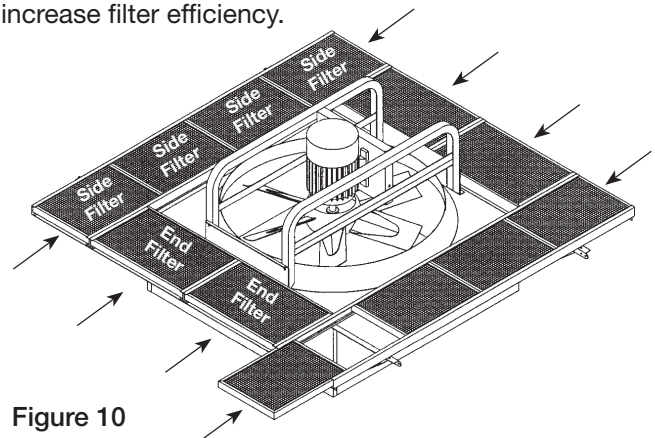


Figure 10

Parts List

Each fan bears a manufacturer's nameplate with model number and serial number embossed. This information will assist the local representative and the factory in providing service and replacement parts. Before taking any corrective action, make certain unit is not capable of operation during repairs.

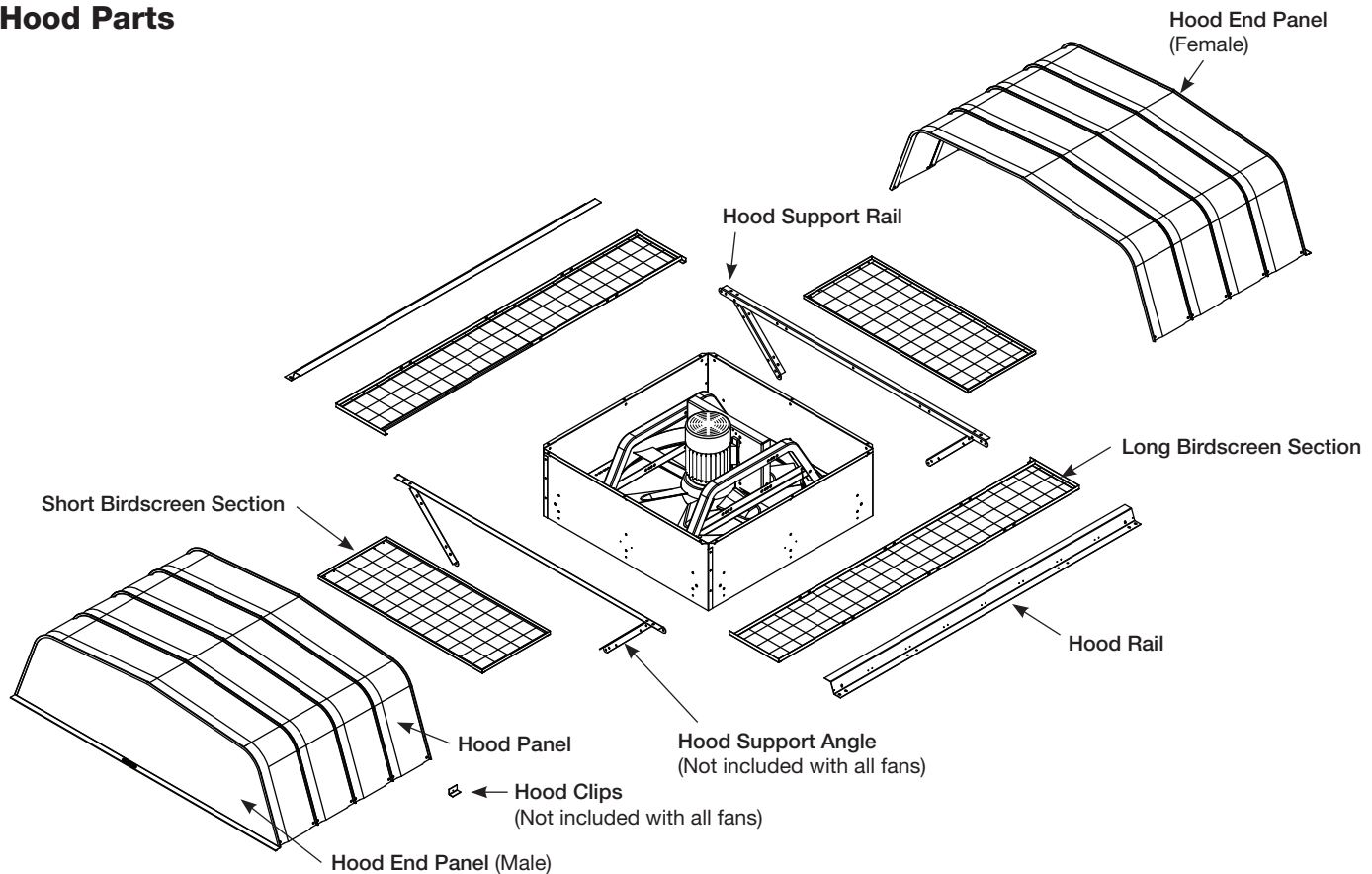
CAUTION

A fan manufactured with an explosion resistant motor does not certify the entire unit to be explosion proof. Refer to UL Listing Mark for the fans approved usage.

CAUTION

La présence d'un moteur antidéflagrant sur un ventilateur ne garantit pas que tout l'appareil est antidéflagrant. Pour connaître les emplois autorisés de l'appareil, voir son marquage de conformité UL.

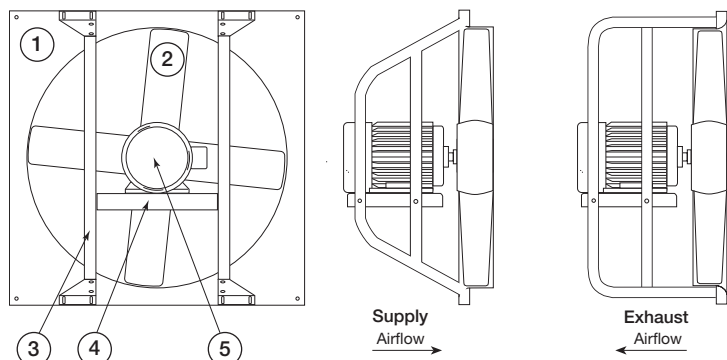
Hood Parts



Direct Drive Fan Parts

Exhaust and Supply Models

1. Fan Panel
2. Propeller
3. Drive Frame Channels (2)
4. Motor Plate
5. Motor



Belt Drive Fan Parts

Construction Levels 1, 2 and 3

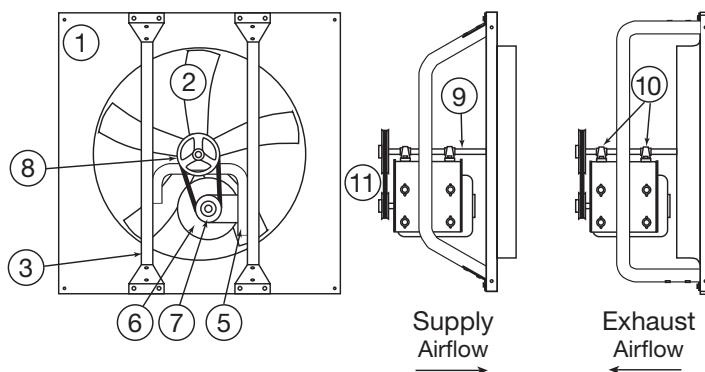
Models Exhaust, Supply and Filtered Models

Construction Level 3

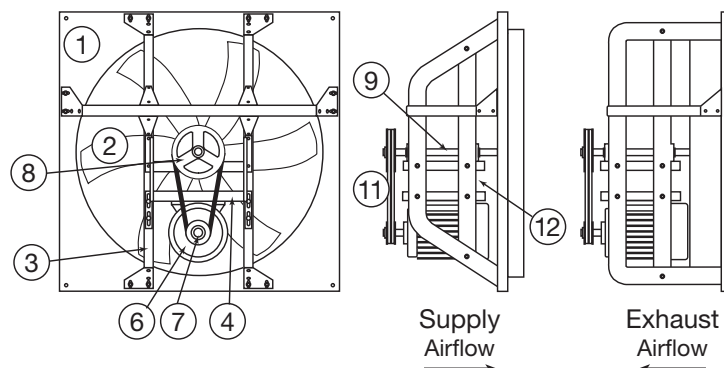
Models Exhaust, Supply, Filtered and Reversible

1. Fan Panel
2. Propeller
3. Drive Frame Channel (2)
4. Motor Plate
5. J Plate
6. Motor
7. Motor Pulley
8. Shaft Pulley
9. Fan Shaft
10. Bearings (2)
11. Belt
12. Bearing Plate (Level 3 fans only - not shown)

Levels 1 and 2



Level 3



Troubleshooting

WARNING

Before taking any corrective action, make certain unit is not capable of operation during repairs.

AVERTISSEMENT

Avant d'entreprendre toute action corrective, s'assurer que l'appareil ne pourra pas fonctionner durant les réparations.

Problem	Cause	Corrective Action
Reduced Airflow	System resistance too high.	Check backdraft dampers for proper operation. Remove obstruction in ductwork. Clean dirty filters. Check for adequate supply air for exhaust fans or exhaust air for supply fans.
	Fan too close to damper.	Increase distance between fan and damper.
	Unit running backwards.	See Pre-Starting Checks.
	Fan speed too low.	Increase fan speed. (See page 16)
	Excessive dirt buildup on propeller.	Clean propeller.
Excessive Noise or Vibration	Bearings.	Tighten bearing collars and set screws. Lubricate bearings. Replace defective bearings.
	V-belt drive.	Tighten pulleys on motor and fan shaft. Adjust belt tension. Align pulleys. Replace worn belts or pulleys. See "Routine Maintenance".
	Excess vibration.	Remove dirt buildup from propeller. Check all set screws and fasteners for tightness. Check for worn bearing. Correct propeller imbalance. Check for loose dampers, guards or ductwork.
	Defective motor.	Replace motor.

Maintenance Log

Date _____ Time _____ AM/PM
Notes: _____

Date _____ Time _____ AM/PM
Notes: _____

Date _____ Time _____ AM/PM
Notes: _____

Date _____ Time _____ AM/PM
Notes: _____

Date _____ Time _____ AM/PM
Notes: _____

Date _____ Time _____ AM/PM
Notes: _____

Date _____ Time _____ AM/PM
Notes: _____

Date _____ Time _____ AM/PM
Notes: _____

Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at www.amca.org.

