

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.

Rooftop Supply Mixed Flow Fans

Fans are direct-driven with mixed flow wheels and feature rigid construction, high efficiency, and low sound levels. These fans are designed for filtered roof supply applications such as providing non-tempered make-up air. The fans are available in twelve sizes and feature permanent, washable aluminum filters.

Units that ship fully assembled: Horizontal intake sizes 7 through 24, bottom intake sizes 7 through 22

Units that ship with hood knockdown for field assembly: Horizontal intake sizes 27 through 33, bottom intake sizes 24 through 33



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. 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 wheel 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 wheel faster than max cataloged fan RPM. This could cause catastrophic wheel failure. 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 or fan while the fan is running.
8. Never remove covers protecting electrical components while fan is energized.

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.

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.

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 a notation 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 fans must be done with care to avoid damaging the housing. Fans are to be rigged and moved by the isolator holes on top of the unit or by the skid when a forklift is used. Location of the isolator holes will always be on the top four corners. Use a minimum of four lifting straps. 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.

Move fan to desired location and determine position of access panels, discharge and motor. Make sure the outlet has at least 3 times the wheel diameter of straight duct before any obstructions like an elbow or transition. See Dimensional Data (page 3) for physical dimensions. The motor's amperage and voltage ratings must be checked for compatibility to supply power prior to final electrical connection. Electrical lead-in wires are then connected to the electrical wires run to the external factory supplied junction box. All wiring must conform to local and national codes.

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 dry parts and packages, use a portable electric heater to get rid of any moisture buildup. Leave coverings loose to permit air circulation and to allow for periodic inspection.

The unit should be stored at least 3-1/2 inches (89 mm) 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.

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 wheel by hand ten to fifteen revolutions to distribute lubricant in motor. 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.

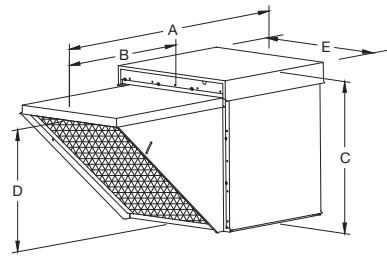
Machined parts coated with rust preventive should be restored to good condition promptly if signs of rust occur. Immediately remove the original rust preventive coating with petroleum solvent and clean with lint-free cloths. Polish any remaining rust from surface with crocus cloth or fine emery paper 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

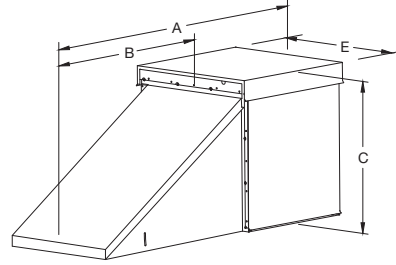
As fans are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion until the fan equipment goes into operation.

Dimensional Data

Fan Dimensions



HORIZONTAL INTAKE



BOTTOM INTAKE

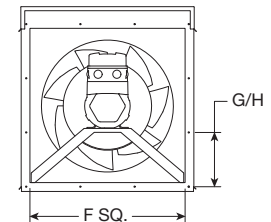
Fan Size	Horizontal Intake					Bottom Intake				Max. Fan Weight [^]
	A	B	C	D	E	A	B	C	E	
7	32-1/2	17	16-3/8	11-3/8	15-1/4	36	20-3/8	16-3/8	15-1/4	85
9	36-1/2	19	20-7/8	16	19	41-3/4	24-1/4	20-7/8	19	106
12	43-1/2	22-1/2	23-1/4	18-1/4	22-1/8	50	29	23-1/4	22-1/8	144
15	54-3/4	29-1/4	27	22	25-7/8	62-1/8	36-1/2	27	25-7/8	212
16	57	30-3/8	29	24	28	65-1/4	38-3/4	29	28	236
18	59-1/4	31-1/2	31-5/8	26-5/8	30-1/2	69	41-1/4	31-5/8	30-1/2	285
20	64-3/4	34-1/2	64-1/4	29-1/4	33	75-1/2	45-1/4	34-1/4	33	394
22	71-1/4	38-1/8	37	32	36	82-3/4	49-5/8	37	36	447
24	78-1/2	42	40-1/2	35-1/2	39-3/8	91-1/2	54-7/8	40-1/2	39-3/8	498
27	86	46	44	39	42-7/8	100-1/8	60-1/8	44	42-7/8	712
30	94-1/2	50-1/2	48	43	46-7/8	100-1/4	66-1/4	48	46-7/8	799
33	103-3/4	55-3/8	52-1/4	47-1/4	41-1/4	121-3/8	72-7/8	52-1/4	41-1/4	922

All dimensions in inches and weight is shown in pounds. [^]Weight shown is standard galvanized construction and largest cataloged totally enclosed EC motor.

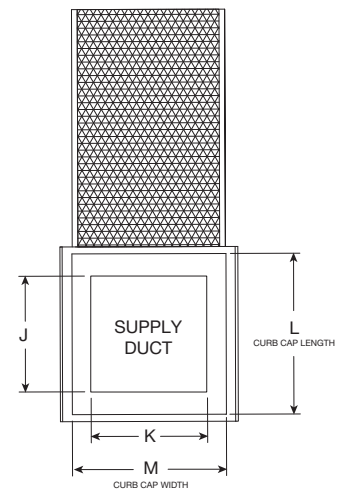
Mounting Dimensions

Fan Size	Horizontal Discharge			Bottom Discharge		Curb Cap	
	F Sq.	G (Hole Spacing)	H (Holes per side)	J	K	L (Length)	M (Width)
7	11-3/8	6-1/2	3	9-1/2	6-3/4	14-1/4	11-1/2
9	15-1/8	8-1/4	3	11-1/2	10-1/2	16-1/4	15-1/4
12	18-1/4	9-7/8	3	15	13-1/2	19-3/4	18-1/4
15	22	11-3/4	3	19-1/2	17-1/4	24-1/4	22
16	24	8-1/2	4	20-1/2	19-1/4	25-1/4	24
18	26-5/8	9-3/8	4	21-1/2	22	26-1/4	26-3/4
20	29-1/4	10-1/4	4	24-1/4	24-1/4	29	29-1/4
22	32	11-1/4	4	27	27-1/4	31-3/4	32
24	35-1/2	9-1/4	5	30-1/2	30-1/2	35-1/4	35-1/2
27	39	10-1/8	5	33-3/4	33-3/4	38-1/2	39
30	43	11-1/8	5	36-1/2	36-1/2	42-1/2	43
33	47-1/4	9-3/4	6	40-1/2	40-1/2	47	47-1/2

All dimensions in inches.



HORIZONTAL DISCHARGE



BOTTOM DISCHARGE

Pre Start-Up Checks

Before Fan Installation

Before starting up or operating fan, check all fasteners for tightness. In particular, check the cap screws in wheel bushing.

Wheel Alignment

1. Rotate the fan wheel by hand and assure no parts are rubbing. The wheel should rotate freely and be aligned as shown in Figure 1. Wheel position is preset and the unit is tested at the factory.
2. Movement may occur during shipment, and realignment may be necessary.

Radial Gap - If necessary, adjust inlet cone position such that the radial gap between the wheel cone and inlet cone is evenly distributed around the wheel.

Alignment - If necessary, adjust wheel position by loosening the wheel hub (see Tapered Bushing Installation and Removal on page 9) from the motor shaft so that a straight edge held tight to the wheel cone just touches the inlet cone. Refer to Figure 1.

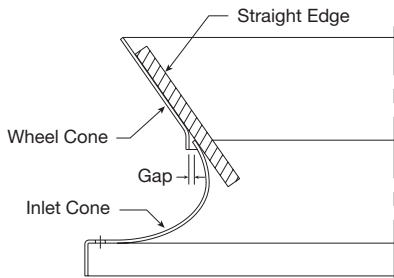


Figure 1

Recommended Fastener Torque

Size	Type	Recommended Torque in-lb (ft-lb)		Application
		Min.	Max.	
#12	Self-Drilling Sheet Metal Screw	25 (2)	30 (2.5)	Outdoor Panels
1/4 in.	Hex Bolt/Thumb Screw	96 (8)	108 (9)	Ductwork and Accessory Mounting
1/4 in. x 20	Cap Screw	120 (10)	120 (10)	QT Bushing (Size 7-24)
1/4 in. x 20	Cap Screw	108 (9)	108 (9)	SD Bushing (Size 27-33)
5/16 in.	Semi-Gimlet Bolt	132 (11)	144 (12)	Fan Construction
3/8 in.	Serrated Flange Bolt/Nut	252 (21)	288 (24)	Motor Mount
1/2 in.	Serrated Flange Bolt/Nut	564 (47)	636 (53)	Motor Mount

Operation

IMPORTANT: The fan has been checked for mechanical noise at the factory prior to shipment. If mechanical noise should develop, suggested corrective actions are offered in the Troubleshooting section (page 10).

1. After the fan is installed, disconnect and lock-out all power switches to fan.
2. Before connecting the fan to power, turn the fan wheel by hand to be sure it is not striking the inlet cone (venturi) or any obstacle.
3. Start the fan and shut it off immediately to check rotation of the wheel, see Figure 2.

Wheel Rotation - Direction of wheel rotation is critical. Reversed rotation will result in poor air performance, motor overloading and possible burnout. Rotation should be counterclockwise when viewed from the fan inlet as shown in Figure 2. If wheel rotation is incorrect, switch two of the wiring leads for 3 phase power supply or check motor wiring for single phase power supply. Fan RPM should be checked and verified with a tachometer.

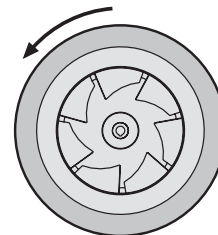


Figure 2

4. When the fan is started, observe the operation and check for any unusual noises.
5. With the system in full operation and all ductwork attached, measure current input to the motor and compare with the nameplate rating to determine if the motor is operating under safe load conditions.
6. Keep inlets and approaches to fan clean and free from obstruction.

Inspection

Inspection of the fan should be conducted at the first 30 minute and 24 hour intervals of satisfactory operation.

30 Minute Interval - Inspect bolts, setscrews and motor mounting bolts. Adjust and tighten as necessary.

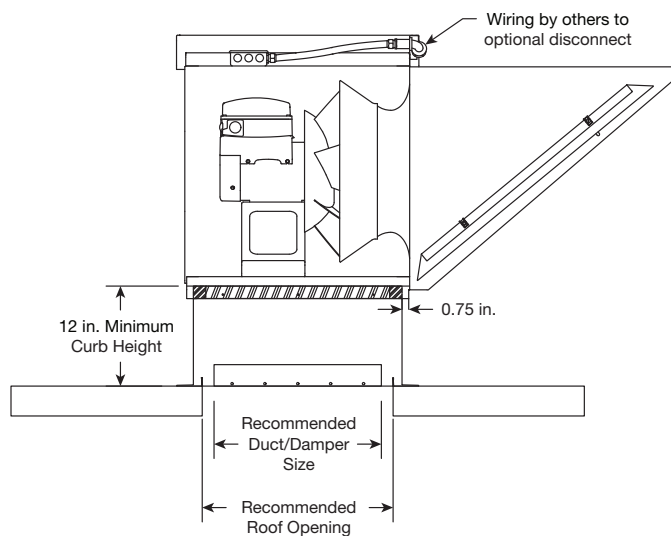
24 Hour Interval - Check all internal components.



Typical Installation

NOTE: For units supplied or used with a Variable Frequency Drive (VFD), reference the VFD documentation for installation requirements, start-up settings, parameter adjustments and trouble shooting. VFDs provided by the manufacturer are factory programmed for basic motor parameters, incoming voltage parameters and maximum operating speed (Hz). Follow NEC and local codes for VFD wiring and installation. If the wire length between the VFD and the controlled motor exceeds 100 ft (30.5 m), DV/DT filters or VFD cabling may be required. Calculations and proper application of DV/DT filters and VFD cabling is by others; failing to do so may result in premature motor failure.

Roof Mounting



Fan Size	Recommended Duct/Damper Size	Recommended Roof Opening
7	9-1/2 x 6-3/4	13-1/4 x 10-1/2
9	11-1/2 x 10-1/2	15-1/4 x 14-1/4
12	15 x 13-1/2	18-1/4 x 17-1/4
15	19-1/2 x 17-1/4	23-1/4 x 21
16	20-1/2 x 19-1/4	24-1/4 x 23
18	21-1/2 x 22	25-1/4 x 25-1/4
20	24-1/4 x 24-1/4	28 x 28
22	27 x 27-1/4	31-1/4 x 31-1/4
24	30-1/2 x 30-1/2	34-1/4 x 34-1/4
27	33-3/4 x 33-3/4	37-1/2 x 37-1/2
30	36-1/2 x 36-1/2	41-3/4 x 41-3/4
33	40-1/2 x 40-1/2	46 x 46

All dimensions in inches.

STEP 1 - Roof Opening (bottom discharge units only)

- Cut an appropriately sized hole in the roof surface.

STEP 2 - Install Roof Curb

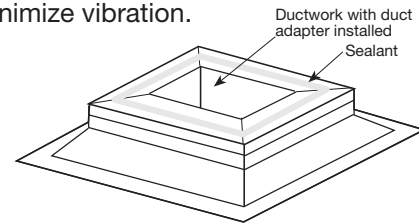
- Position curb on the roof and install curb per manufacturer's instructions. Caulk and flash curb to ensure a water tight seal.

STEP 3 - Install Ductwork (bottom discharge units only)

- Good duct practices should be followed in accordance with SMACNA and AMCA guidelines, NFPA 96 and any local codes. The discharge should have approximately three duct diameters of straight duct to achieve cataloged performance (see table below). The ductwork should extend far enough above the roofline to meet the supply unit once it is installed. A duct adapter is recommended for bottom discharge to align ductwork with the unit. The duct adapter is only a guide and is not to be used as a support for the ductwork. Fans may be configured with a damper, and the ductwork may not be able to run up to the bottom of the supply unit. In this case, mount the ductwork beneath the damper.

STEP 4 - Apply Sealant

- Before installing supply unit, apply a sealant around the perimeter of the supply duct to isolate the fan and minimize vibration.



STEP 5 - Install Unit

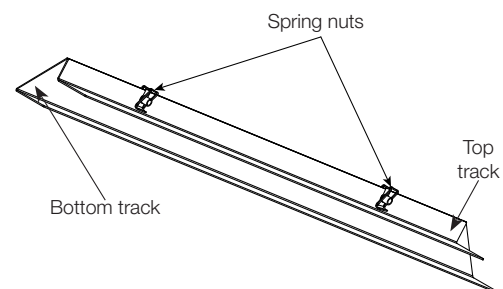
- Use a crane and set of spreader bars hooked to the isolator holes on the top of the unit to lift and center the unit on the curb in the correct orientation. Use self-tapping sheet metal screws to fasten unit to the curb through provided holes. Electrical connections can be made at this time.

NOTE: Always use all four lifting holes when using a sling.

STEP 6 - Assemble Filter Tracks x2

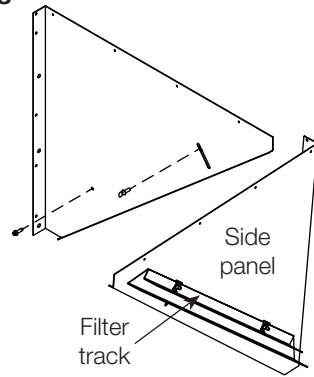
NOTE: Horizontal intake sizes 7-24 and bottom intake sizes 7-22 ship with the hood installed. For units with the hood already installed, skip to Step 10 for ductwork installation instructions.

- Retrieve ship loose intake hood/cover package and prepare parts to be installed on the fan
- Align the holes on the top and bottom filter tracks and install a spring nut over the two overlapping holes. Depending on the fan configuration the filter tracks may utilize a different design than shown.



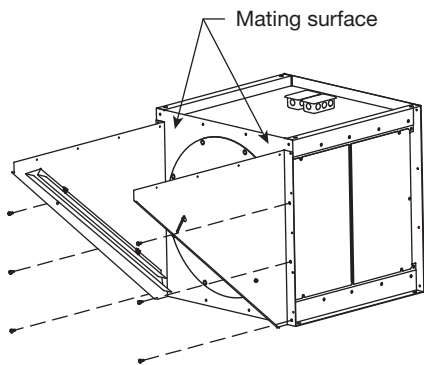
STEP 7 - Fasten Filter Tracks to Side Panels

- Install a 1/4 inch thumb screw in the slot and 1/4 inch bolt in the hole to tighten into the spring nuts
- Position filter tracks on the opposite side of the side panel flanges



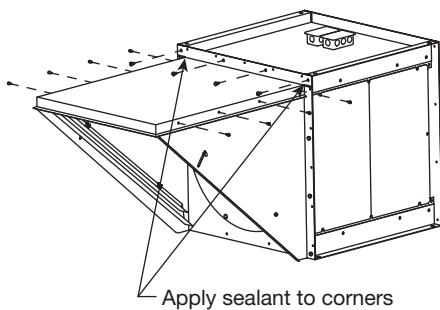
STEP 8 - Install Side Panels

- Apply sealant to the mating surface of the inlet panel
- Use the provided 5/16 inch fasteners to install both side panels to the inlet of the fan with filter tracks facing each other, do not fully tighten



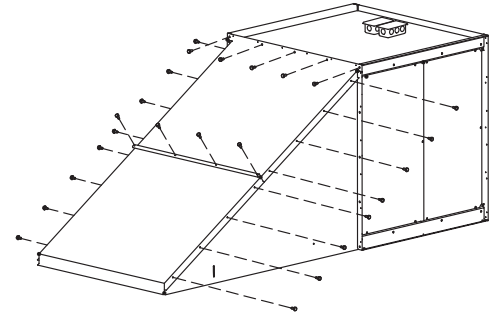
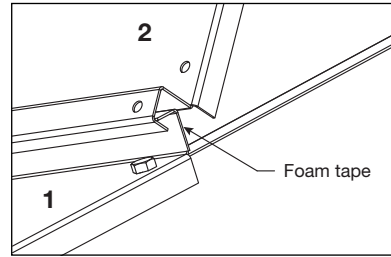
STEP 9 - Install Top Panel

- Horizontal intake:
 1. Place the top panel on top of both side panels and against the inlet panel (ensure side panels are inside the top panel)
 2. Use the provided 5/16 inch fasteners to attach the top panel to the inlet of the fan
 3. Use the provided sheet metal screws to fasten the top panel to the side panels
 4. Fully tighten the 5/16 inch fasteners holding the side plates to the inlet plate
 5. Apply sealant to the corners where the top panel meets the inlet panel.



- Bottom intake:
 1. Install the first panel with the single return flange using the provided self-tapping sheet metal screws (reference 1)

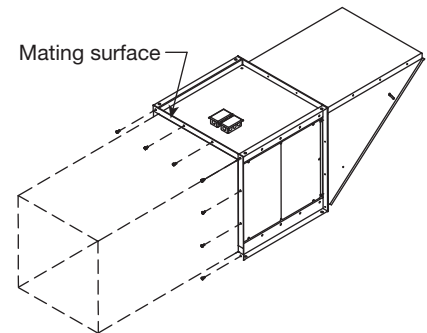
2. Install the second hood top panel with the double return flange by hinging it around the first panel as illustrated (reference 2)
3. Use the self-tapping sheet metal screws to mount the second panel



STEP 10 (Horizontal Discharge Only) - Install Ductwork

- Apply sealant to the mating surface of fan outlet
- Use the provided holes to mount ductwork and/or duct adapters to the horizontal discharge of fan (hardware supplied by others). C-clamp locking pliers can be used to hold the duct

NOTE: For units with the hood already installed, skip to step 14 for further installation instructions



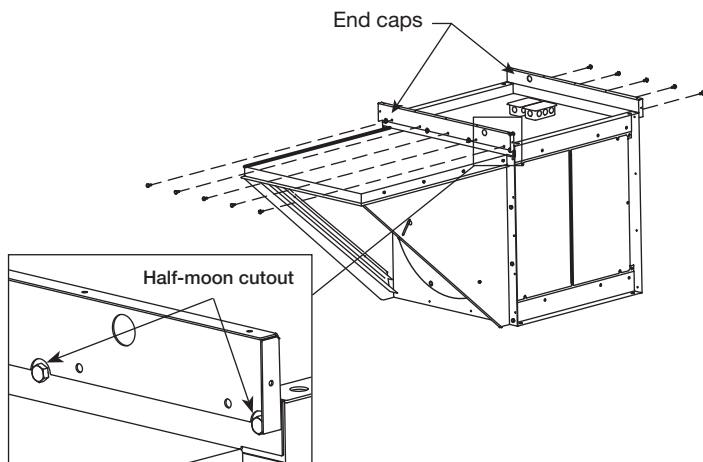
Fan Size	Horizontal Discharge Duct Size
7	11-1/2 x 11-1/2
9	15-1/4 x 14-1/4
12	18-1/4 x 18-1/4
15	22 x 22
16	24 x 24
18	26-3/4 x 26-3/4
20	29-1/4 x 29-1/4
22	32-1/4 x 32-1/4
24	35-1/2 x 35-1/2
27	39 x 39
30	43 x 43
33	47-1/2 x 47-1/2

All dimensions in inches.



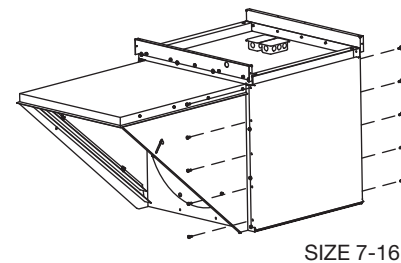
STEP 11 - Install End Caps

- TAKE CARE NOT TO DAMAGE THE FOAM TAPE ON THESE PARTS
- With the flanges away from the fan, align the half-moon cutouts on the end cap with the screws on the inlet and outlet
- Use the provided self-tapping sheet metal screws to fasten the end cap to the fan DO NOT OVERTIGHTEN
- Install remaining end cap on the opposite side using provided self-tapping sheet metal screws DO NOT OVERTIGHTEN

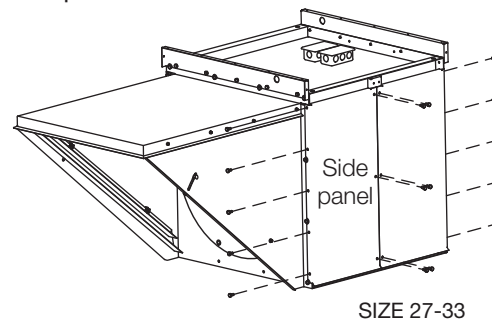


STEP 13 - Install Side Panels

- Install with the drip edge down and align the half-moon cutouts on the side panel with the inlet and outlet fasteners
- Fasten the side panels to the fan with the provided sheet metal screws

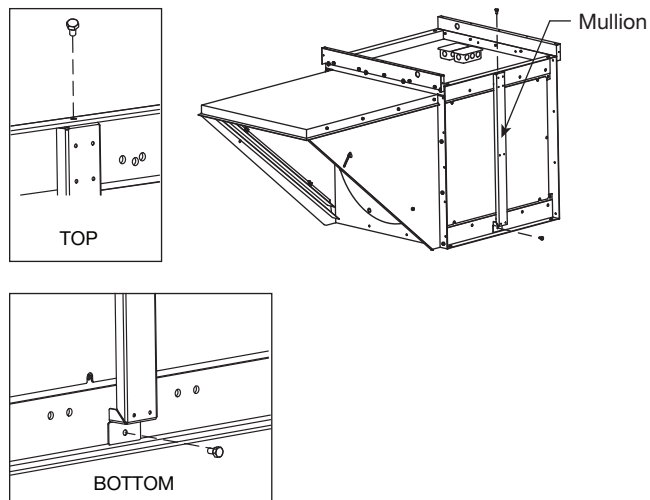


- Sizes 27-33 have (2) panels per side, which are fastened to the mullions and to the inlet and outlet plates



STEP 12 (Sizes 27-33 only) - Install Side Mullions

- Install the left and right side mullions using two self-tapping sheet metal screws per side



STEP 14 - Mount Disconnect Switch (if applicable)

NOTE: For units with the hood already installed, in order to route wiring the top panel in Step 17 must be removed and reinstalled

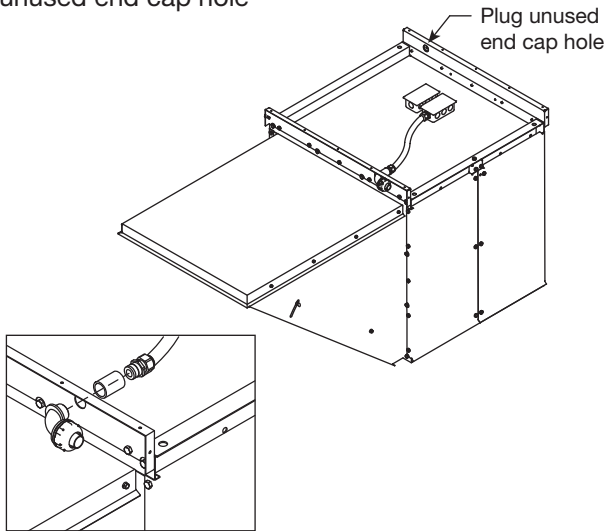
- Determine ideal location for the disconnect switch
- Install disconnect per manufacturer's suggestions

STEP 15 - Install Conduit

- Connect the provided flexible metal conduit (FMC) to the power junction box
- Route the opposite end of the conduit assembly with the female connector to the hole in end cap
- Insert the liquid-tight connector into the hole in the end cap and screw into the female connector, as shown
- Cut the liquid-tight conduit (supplied by others) to length, and install from the elbow to the disconnect switch or power supply

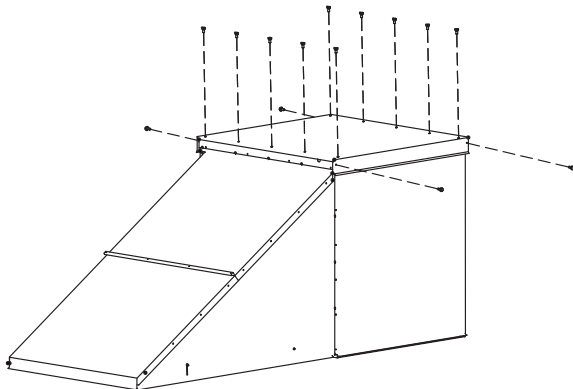
STEP 16 - Route Wiring to Junction Box

- Route the wiring from the junction box to the disconnect through all conduit
- Junction boxes (and “Dial on Fan” if Vari-Green®) on top of the fan are inaccessible when outdoor cover is fully installed
- Using the plug provided in the conduit kit, plug the unused end cap hole



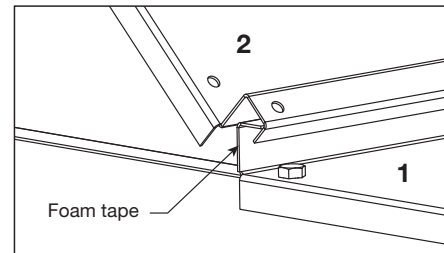
STEP 17 - Install Top Panel(s) of Cover

- TAKE CARE NOT TO DAMAGE THE FOAM TAPE ON THESE PARTS
- Size 24:
Install the top panel of the outdoor cover to the fan using the provided self-tapping sheet metal screws

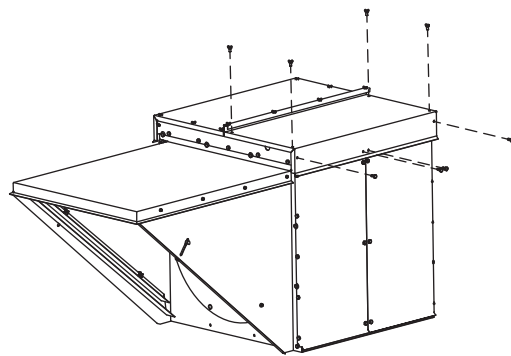


- Sizes 27-33:

1. Install the first top panel with the single return flange using the provided self-tapping sheet metal screws (reference 1)
2. Install the second top panel with the double return flange by hinging it around the first panel as illustrated (reference 2)



3. Use the self-tapping sheet metal screws to mount second panel



STEP 18 - Install Filter(s)

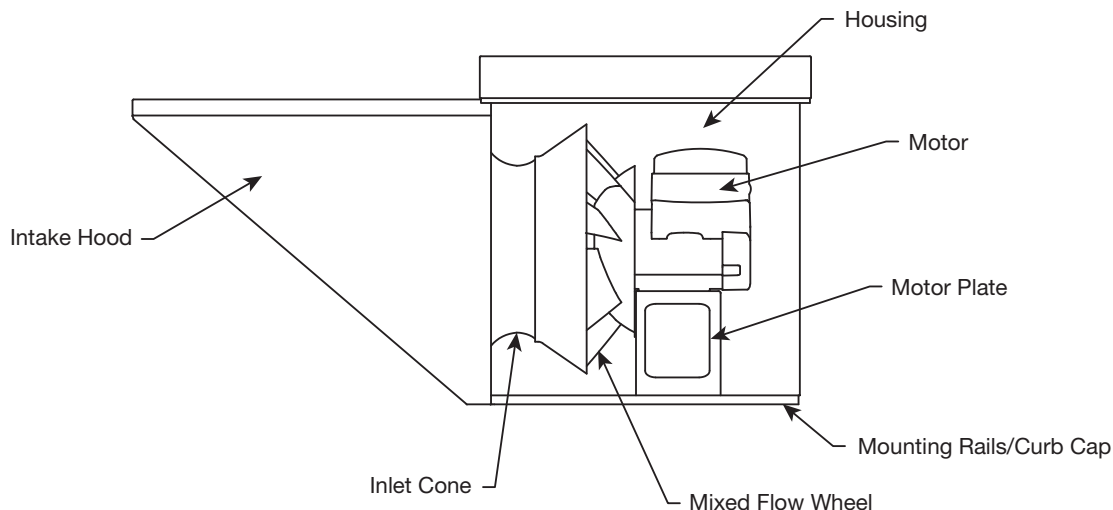
- Loosen both thumb screws on the intake hood and drop filter tracks
- Aluminum washable filters come standard with the unit
- MERV13 pleated filters are optional and stack on top of the aluminum filters
- Return the filter tracks up to the operating position and tighten the thumb screws
- Follow filter replacement and/or cleaning intervals recommended by the filter supplier

Fan Size	Filter Size	Qty.
7	18-1/4 x 10-1/2	1
9	22 x 14-1/4	1
12	26-3/4 x 17-1/2	1
15	34-1/2 x 21-1/4	1
16	36-1/2 x 23-1/4	1
18	39-1/4 x 25-3/4	1
20	28-1/2 x 21 1/2	2
22	31-1/4 x 23-3/4	2
24	34-3/4 x 26-1/2	2
27	38-1/4 x 29	2
30	40 x 21-1/4	3
33	40 x 23-1/2	3

All dimensions in inches.

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 servicing, assure unit is not capable of operation during repairs.



NOTE: Fan size 18 and larger have additional internal structural supports.

Maintenance

DANGER

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

WARNING

This unit should be made non-functional when cleaning the wheel or housing (fuses removed, disconnect locked off).

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.

AVERTISSEMENT

L'appareil doit être rendu non opérationnel lors du nettoyage de la turbine ou du caisson (fusibles retirés, sectionneur verrouillé).

Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and who are experienced with this type of equipment.

Filters

One-inch washable aluminum mesh filters are standard. Optional two-inch MERV 13 filters may be supplied on some bottom intake configurations. Filters should be cleaned and/or replaced on a regular basis for optimum efficiency. To remove the filters, loosen thumb screw on the sides of the intake hood and drop down the filter tray. Then slide the filters out the front of the hood. Aluminum filters can be washed in a mild detergent solution. If desired, an adhesive spray available at most filter distributors can be applied to increase filter efficiency. Follow filter manufactures guidelines for replacement intervals on pleated filters.

All fasteners should be checked for tightness each time maintenance checks are performed prior to restarting unit.

A proper maintenance program will help these units deliver years of dependable service.

Motor

Motor maintenance is generally limited to cleaning and lubrication (where applicable). Cleaning should be limited to exterior surfaces only. Removing dust buildup on motor housing ensures proper motor cooling.

Greasing of motors is only intended when fittings are provided. Many fractional horsepower motors are permanently lubricated and should not be lubricated after installation. Motors supplied with grease fittings should be greased in accordance with manufacturers' recommendations. As a general rule where motor temperatures do not exceed 104°F (40°C), the grease should be replaced after 2,000 hours of running time.

Wheel

Wheels require very little attention when moving clean air. Occasionally, oil and dust may accumulate causing imbalance. When this occurs the wheel and housing should be cleaned to ensure smooth and safe operation.



IMPORTANT: Uneven cleaning of the wheel will produce an out of balance condition that will cause vibration in the fan.

Tapered Bushing Hub

For wheel hubs utilizing a tapered bushing interface, follow this procedure for installation and removal.

Bushing Removal

1. If present, loosen the setscrew holding the bushing and shaft key in place.
2. Loosen and remove the socket head cap screws which fasten the bushing to the hub as shown in Figure 3.
3. Take the socket head cap screws that were removed and install them into the visibly threaded holes on the wheel hub.
4. Once socket head cap screws are installed, tighten them an eighth of a turn at a time, alternating until the bushing comes loose.

Bushing Installation

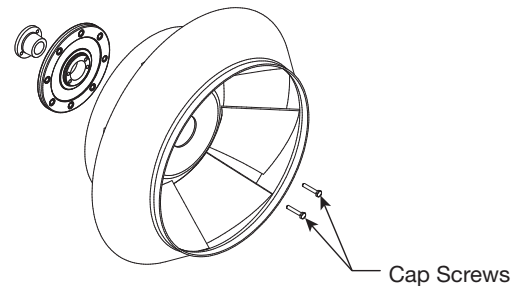


Figure 3

1. Clean all surfaces of hub and bushing to remove any oil or residue present and do not use any lubricant to install bushing into the hub.
2. Slide the bushing and shaft key onto the fan shaft followed by the wheel and hub assembly. If present, use the keyway setscrew to hold the shaft key and bushing in place but **DO NOT** overtighten as this can damage the bushing. Align the unthreaded holes of the hub with the threaded holes of the tapered bushing.
3. The socket head cap screws are adjustable from the inlet of the fan. Install the bushing socket head cap screws into the aligned holes by hand (or without excessive torque).
4. Adjust the axial location of the wheel in the fan relative to the inlet cone (venturi) as shown in Figure 1, page 4. Then tighten the socket head cap screws an eighth turn at a time in an alternating fashion and to a torque of 10 ft·lbs for QT bushings and 9 ft·lbs for SD bushings.

NOTE: QT or SD is labeled on the outer edge of the bushing. QT bushings have two cap screws and SD bushings have three cap screws.

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

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Date _____ Time _____ AM/PM

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Date _____ Time _____ AM/PM

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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
Ventilator Inoperative	Blown fuse or breaker	Replace or repair
	Incorrectly wired	Shut power OFF and check wiring for proper connections
	Defective motor	Replace or repair
Insufficient Airflow	Clogged filters	Clean or replace
	Incorrect wheel rotation	Correct rotation, see page 4, step 3 to correct wheel rotation
	Excessive dirt build up on wheel	Clean wheel
	Improper wheel alignment	Center wheel on inlet cone, see figure 1 (page 4)
	Fan RPM too slow	Adjust speed with Vari-Green® control or VFD (if applicable)
	Damper closed	Inspect/repair damper
	Loose fitting duct sections permitting air loss	Check for secure connection where duct sections are joined (suggest duct tape at seams for sealed closure)
System resistance too high	Check system: proper orientation and operation of backdraft or control dampers, obstructions in ductwork.	
Excessive Noise or Vibration	Accumulation of material on wheel	Clean wheel
	Loose wheel	Tighten set screws
	Wheel improperly aligned and rubbing	Center wheel on inlet cone, see figure 1 (page 4)
	Wheel out of balance	Check wheel balance, rebalance in place if necessary
	Foreign objects in wheel or housing	Remove objects and check for damage or imbalance
	Ventilator base not securely anchored	Secure properly
Motor Overloads or Overheats	Incorrect wheel rotation	Check motor wiring
	Shorted motor winding	Replace motor
	Over/Under line voltage	Contact power company

For Vari-Green® motor troubleshooting, refer to the Vari-Green Motor Installation, Operation, and Maintenance Manual.

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.

