EF-01

Installation, Operation and Maintenance Manual

EQUIPMENT: Greenheck Mixed Flow Fans

PROJECT: Pleasant Valley Country Club – Club House Renovation

LOCATION: Little Rock, AR

MECHANICAL CONTRACTOR: Comfort Systems, USA

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GREENHECK
Building Value in Air.

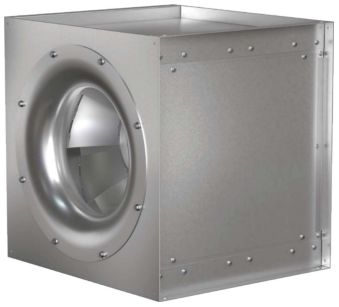
Document 485448
Model SQ Direct Drive
Square Inline Mixed Flow Fans

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.

Square Inline Mixed Flow Fans

Fans are direct-driven with mixed flow wheels and feature ridged construction, high-efficiency and low sound levels. These compact inline fans are the ideal selection for indoor and outdoor clean air applications including intake, exhaust, return, or make-up air systems. The square housing design, compact size, and straight-thru airflow also provide the system designer the flexibility to mount in horizontal and vertical orientations. Each fan displays a permanently stamped metal nameplate with complete model number, mark, and unique serial number for future identification.



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 inlet and outlet have at least 3 times the wheel diameter of straight duct before any obstructions like an elbow or transition. Attach the fan to a suitable framework as specified by others; hanging or base vibration isolators are recommended. 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.

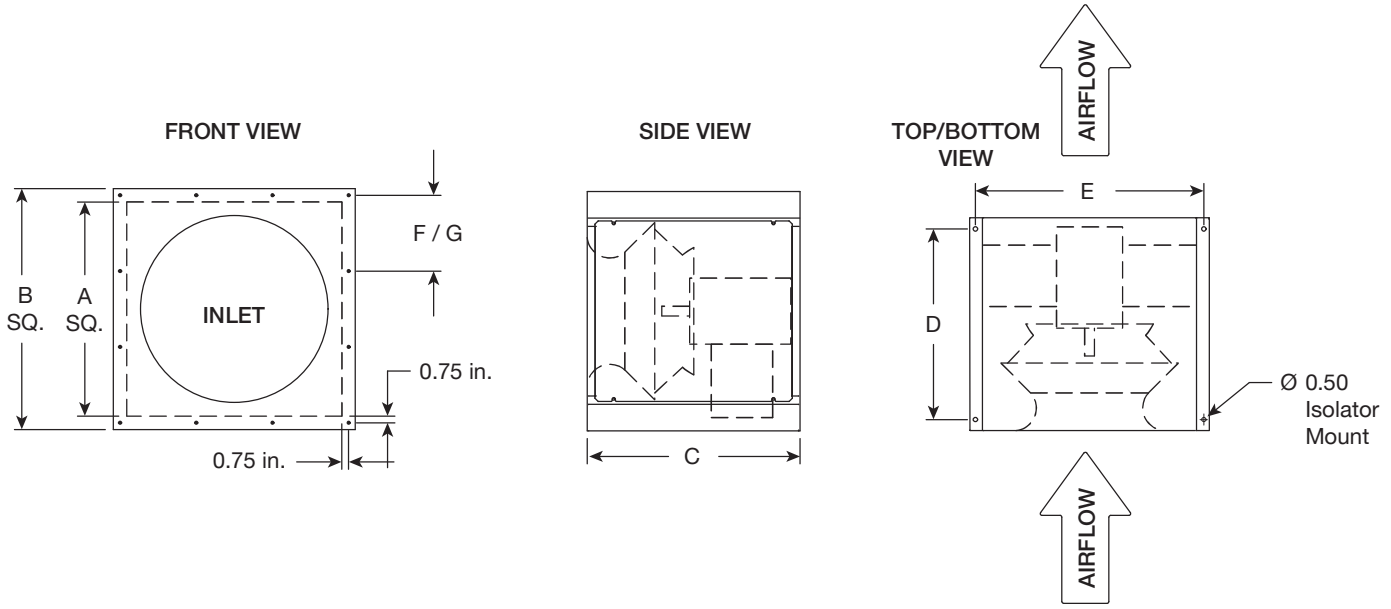
If moisture or dirt accumulations are found on parts, the source should be located and eliminated. At each inspection, rotate the wheel by hand ten to fifteen revolutions to distribute lubricant in motor. If paint deterioration begins, consideration should be given to touch-up or repainting. Fans with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

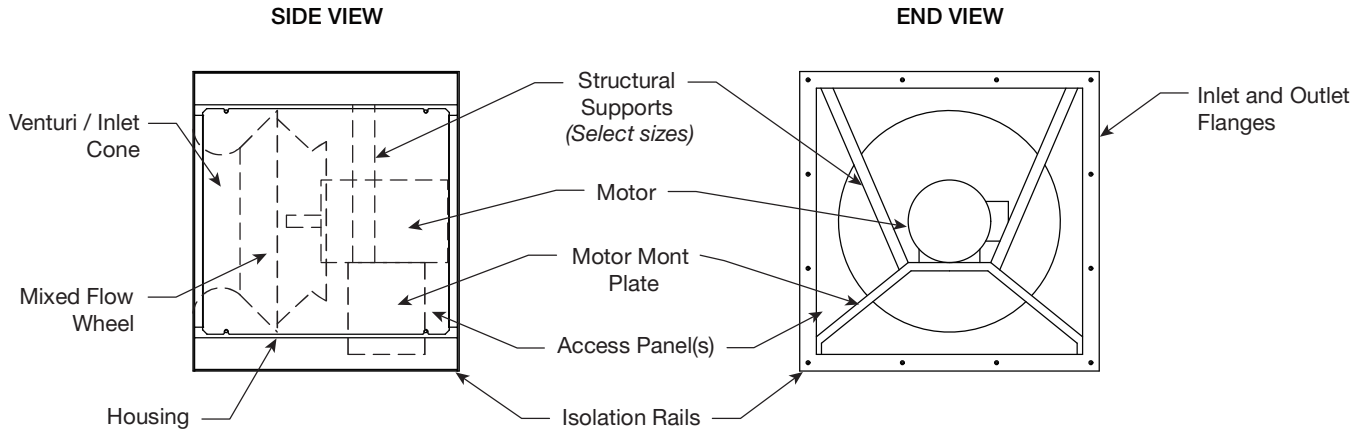


Fan Size	A Sq.	B Sq.	C	D (Isolator)	E (Isolator)	F (Hole Spacing)	G (Holes Per Side)	Max. Fan Weight^
7	11-3/8	14-3/8	14-1/2	12	13-1/8	6-1/2	3	41
9	15-1/8	18-1/8	16-1/2	14	16-7/8	8-1/4	3	52
12	18-1/4	21-1/4	20	17-1/2	20	9-7/8	3	145
15	22	25	24-1/2	22	23-3/4	11-3/4	3	163
16	24	27	25-1/2	23	25-3/4	8-1/2	4	171
18	26-5/8	29-5/8	26-5/8	24-1/8	28-3/8	9-3/8	4	203
20	29-1/4	32-1/4	29-1/4	26-5/8	31	10-1/4	4	218
22	32	35	32	29-1/2	33-3/4	11-1/4	4	389
24	35-1/2	38-1/2	35-1/2	33	37-1/4	9-1/4	5	415
27	39	42	39	36-1/2	40-3/4	10-1/8	5	596
30	43	46	43	40-1/2	44-3/4	11-1/8	5	643
33	47-1/4	50-1/4	47-1/4	44-3/4	49	9-3/4	6	866

All dimensions in inches and weight is shown in pounds. ^Weight shown is standard galvanized construction and largest cataloged totally enclosed motor.
Dimensions A and B are same for height and width.

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.

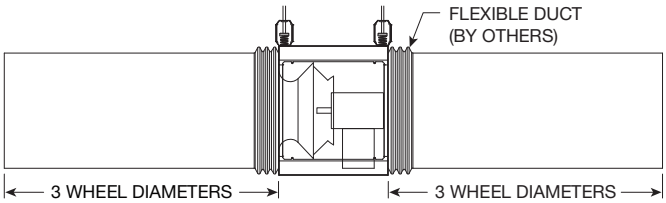
Typical Installation

Mounting Options

Mounting position allows fan to be installed for vertical or horizontal airflow. In addition, the fan can be rotated 90 degrees either direction (access doors on the bottom and top). Isolation is recommended.

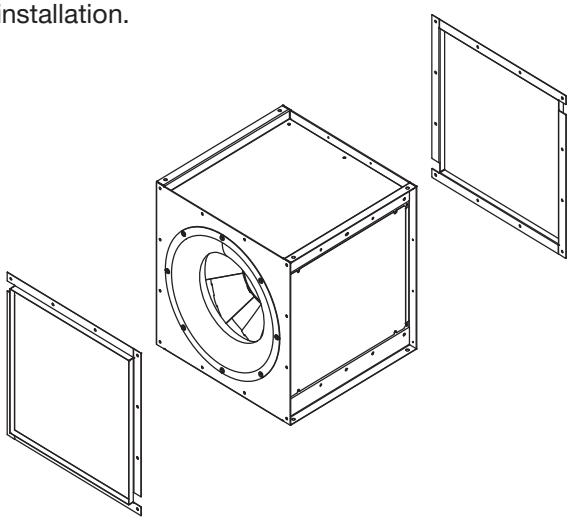
IMPORTANT: Flex duct is recommended for mounting to the inlet of the fan to allow for fitting adjustments. If the inlet cone (venturi) requires adjustment, it can be detached from the unit via the fasteners located on the inlet panel.

IMPORTANT: The inlet and outlet duct should have approximately three wheel diameters of straight duct before and after the fan to achieve cataloged performance.

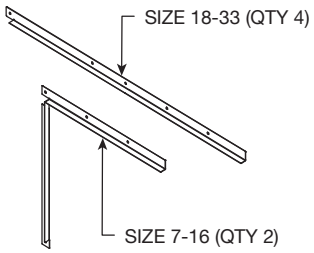


Square Duct Mounting Collars

Inlet and outlet square duct mounting collars are provided for easy slip fit duct connection. Square duct mounting collars are shipped separate for field installation.

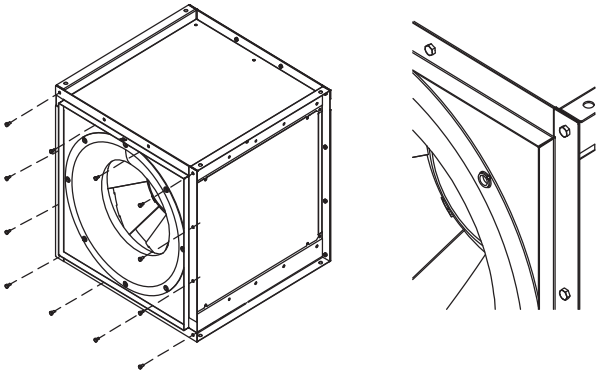


1. Square duct adapter will come in 2 piece or 4 piece designs per inlet/outlet depending on unit size . See Side Discharge on page 5, Step 3 for details on mounting left and right discharge square duct mounting collars.



- SQ-7 to SQ-16 will consist of 2 pieces per inlet/outlet
- SQ-18 to SQ-33 will consist of 4 pieces per inlet/outlet

2. Mount square duct adapter to inlet and/or outlet using appropriate number of flange pieces and 5/16 inch semi-gimlet fasteners provided in hardware kit (no nuts required).



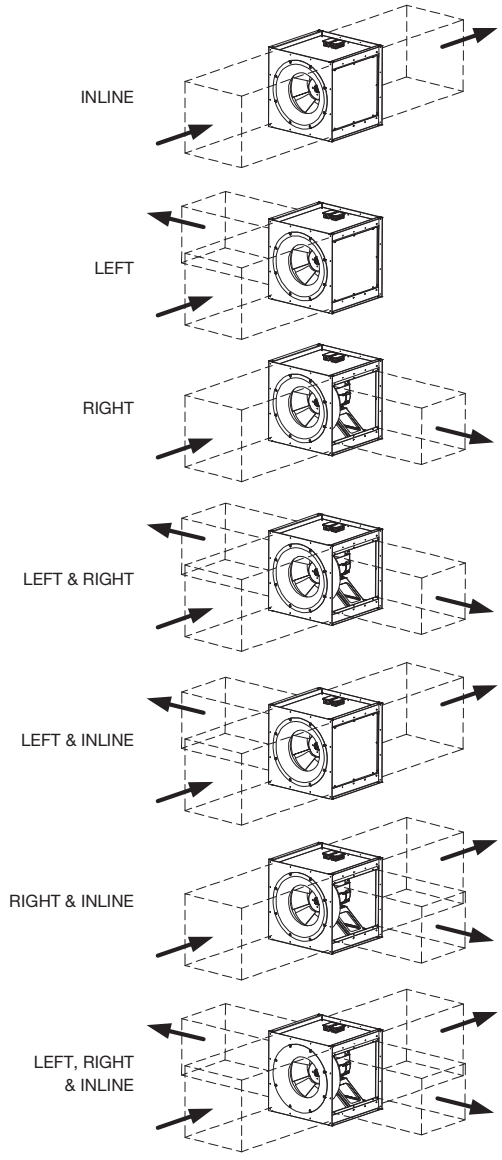
3. Repeat previous step for outlet of fan.
4. Tighten to 132 in·lbs (11 ft·lbs) 1/2 inch socket. **Do not over-tighten.**

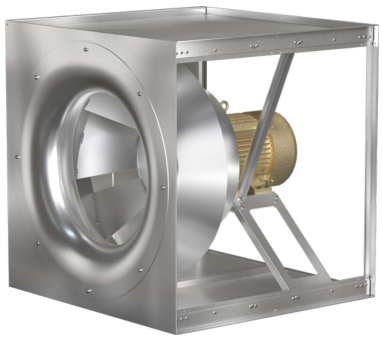
Side Discharge

Fans are configurable with a variety of discharge options - inline, left, right or any combination of the three. This option can help to reduce system effect the overall footprint of the ductwork.

Side Discharge (R&L) Outlet Dimensions

Size	Width (In.)	Height (In.)
7	11-1/4	6-3/4
9	13-1/4	10-1/8
12	16-3/4	13-1/4
15	21-1/4	17
16	22-1/4	19
18	23-3/8	21-5/8
20	26	24-1/4
22	28-3/4	27-1/8
24	32-1/2	30-1/2
27	35-3/4	34
30	39-3/4	38
33	44	42-3/8



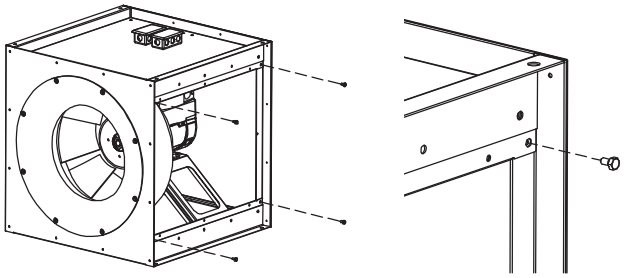


STEP 1 - Remove Access Door(s)

1. Determine the proper discharge configuration based on application and how the fan was ordered from the factory (see to the right).
2. Use an Impact driver and a 1/2 inch socket to remove the 5/16 inch fasteners and access door(s) on left and/or right side of unit if airflow is desired in that direction.
3. The number of access doors and fasteners will change depending on unit size.
4. Save all fasteners from access door to install duct work or square duct adapter flanges.
5. Left and Right discharges will have a blank off panel installed on the inline discharge of the unit.
6. **Do not power up fan without removing at least one discharge panel.**

STEP 2 - Remove Housing Fasteners

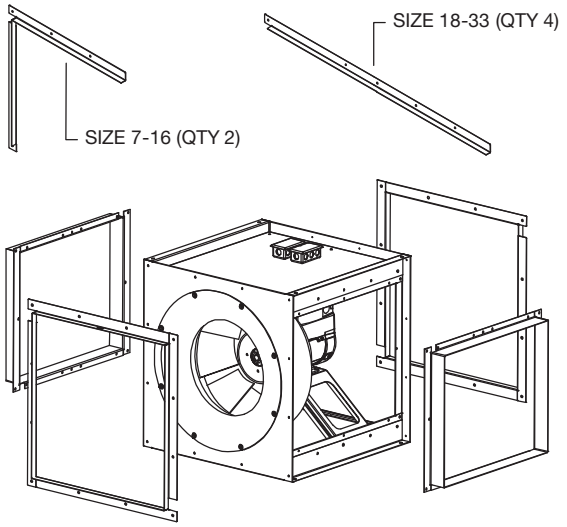
1. Remove (4) additional 5/16 inch fasteners per side on the left and/or right sides of the unit to allow installation of duct work or square duct adapter flanges (see below).
2. Save all fasteners to install duct work or square duct adapter flanges.



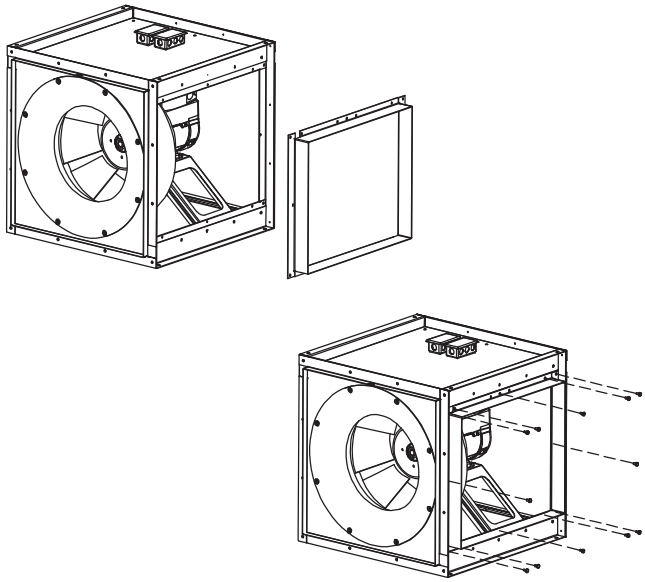
STEP 3 (Optional) - Mount Square Duct Mounting Collars

1. If purchased, square duct adapter flanges are provided for the specific discharge configuration that was ordered (Inline, Left, Right, Left & Right, Left and Inline, Right and Inline, or Left, Right & Inline).

2. Square duct adapter will come in (2) or (4) piece designs depending on unit size (see below).



3. Mount square duct adapters to inlet and outlet(s) depending on discharge configuration using appropriate number of flange pieces and 5/16 semi-gimelt fasteners removed in Steps 1 and 2.
4. **Reinstall fasteners that were removed in Step 2 in the corners of the left and right discharge flanges, not doing so will void warranty and could lead to structural issues with the fan.**

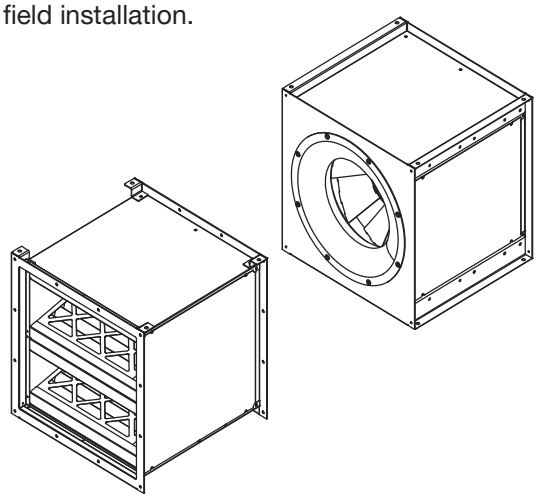


STEP 4 - Install Ductwork to Fan

1. Using holes on inlet and outlet(s) or using square duct adapter flanges, mount ductwork to fan in all desired locations.
2. For Left and Right discharges reuse the 5/16 inch semi-gimlet fasteners removed in Steps 1 and 2.
3. Reinstall fasteners that were removed in Step 2 in the corners of the left and right discharge flanges, not doing so will void warranty and could lead to structural issues with the fan.
4. Hardware for the inlet and Inline discharge is supplied by the others.

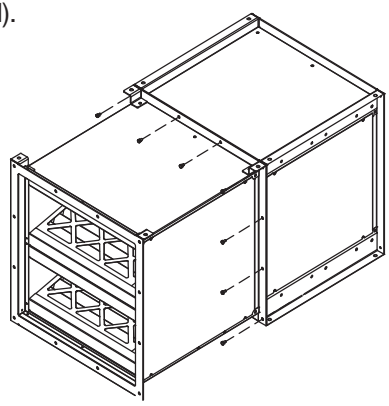
Filtration

The filter box is designed to provide a compact and convenient clean air solution while eliminating the costly process of designing, fabricating, and installing custom filter assemblies. The filter section features removable access panels on both sides, allows for simple and fast filter maintenance. The filter box is shipped separate for field installation.



STEP 1 - Mount Filter Section to Fan

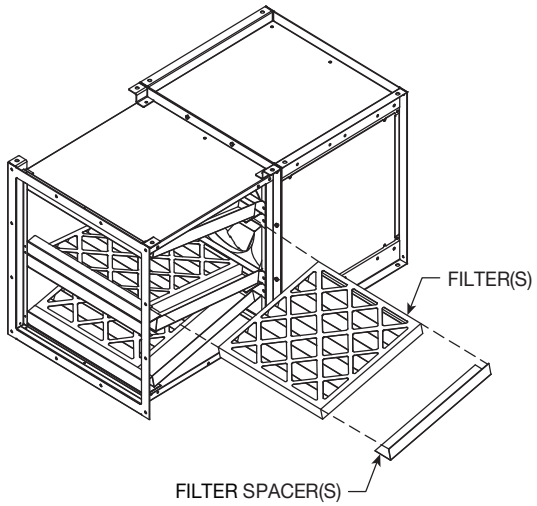
1. Filter section and fan have “Airflow” decals on the exterior of the units, ensure the arrows are aligned with the airflow.
2. Mount the filter section to the inlet of the fan using appropriate number of provided 5/16 inch semi-gimlet fasteners provided in hardware kit (no nuts required).



3. Tighten to 132 in·lbs (11 ft·lbs) with 1/2 inch socket. **Do not over-tighten.**
4. Fan sizing and performance is designed for the filter section to be mounted directly to the INLET of the fan.

STEP 2 - Filter Replacement and Cleaning

Follow filter replacement and or cleaning intervals recommended by filter supplier.



1. Remove access door using 1/2 inch socket. It is only necessary to remove one access door to replace filters.
2. Remove filter spacers and dirty filters.
3. Install new filters in unit and replace filter spacers. Ensure filters are installed in correct orientation for proper airflow (marked on filters). Locate spacers towards the outside of the unit to reduce any unnecessary blockage in airflow.
4. Reinstall access door using 1/2 inch socket, torque to 132 in·lbs (11 ft·lbs). **Do not over-tighten.**

Outdoor Cover

The outdoor cover can be applied to any ducted horizontal base mount outdoor application. UL/cUL 705 listed for outdoor use. The components for this kit are shipped separate from the fan for field installation.

STEP 1 - Mount Unit to Structure

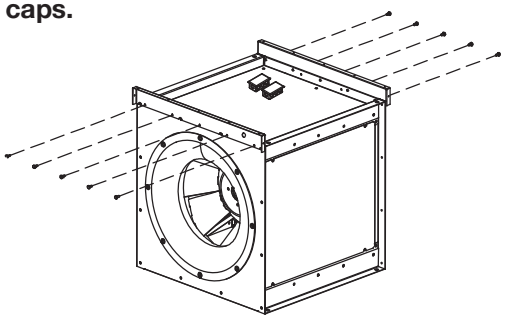
1. Place unit in desired location and mount to structure (outdoor units are horizontal base mount only).

STEP 2 - Install Ductwork to Fan

1. Using holes on inlet and outlet, mount ductwork to fan (hardware supplied by others).

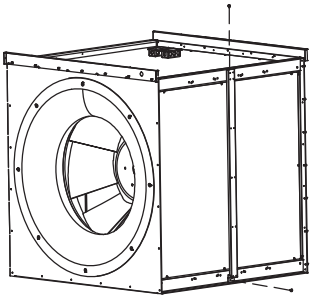
STEP 3 - Install End Caps

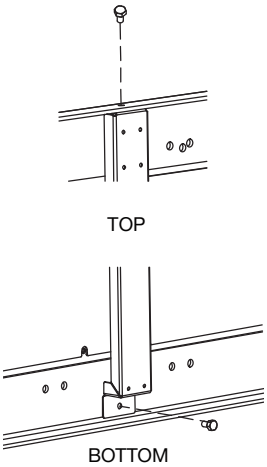
1. Locate the end cap that has a 7/8 inch conduit hole, this is for running power to the fan.
2. Determine which side of the unit (inlet or outlet) the power will be run through.
3. With the flanges away from the fan, mount the end cap with conduit hole to the top of the inlet or outlet depending on where the power will be run, use provided self-tapping sheet metal screws and 5/16 inch impact driver. **Do not over-tighten.**
4. Install remaining plate on opposite side (inlet or outlet) using provided self-tapping sheet metal screws and 5/16 inch impact driver. **Do not over-tighten.**
5. **Take care not to damage the foam tape on end caps.**



STEP 4 (Sizes 18-33 Only) - Install Side Mullions

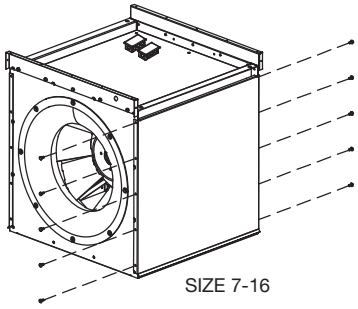
1. Install left and right side mullions using (2) self-tapping sheet metal screws per side.





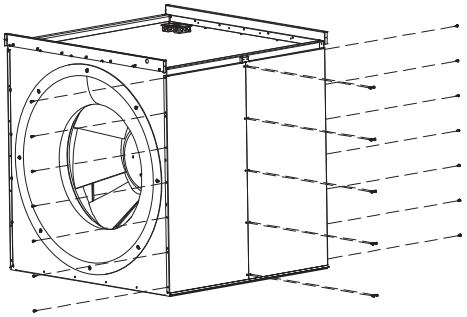
STEP 5 - Install Side Panels

1. Install one side of outdoor cover to fan with drip edge down, use provided self-tapping sheet metal screws and 5/16 inch impact driver.
2. Repeat for opposite side.



SIZE 7-16

3. Sizes 18-33 have (2) panels per side, they are fastened to the mullion, inlet, and outlet plate.



SIZE 18-33

STEP 6 - Mount Disconnect Switch (if applicable)

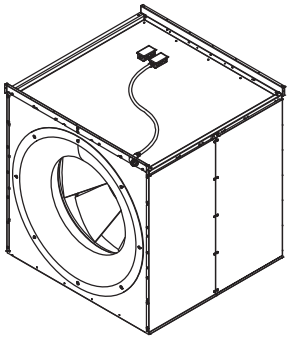
1. Determine ideal location for disconnect switch.
2. Install per disconnect manufacturer's guidelines.

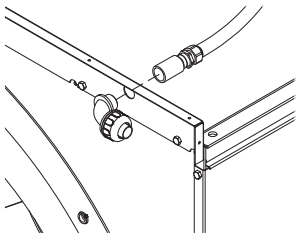
STEP 7 - Install Conduit

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

STEP 8 - Route Wiring to Junction Box

1. Route wiring from junction box on top of fan to switch through all conduit and fittings.



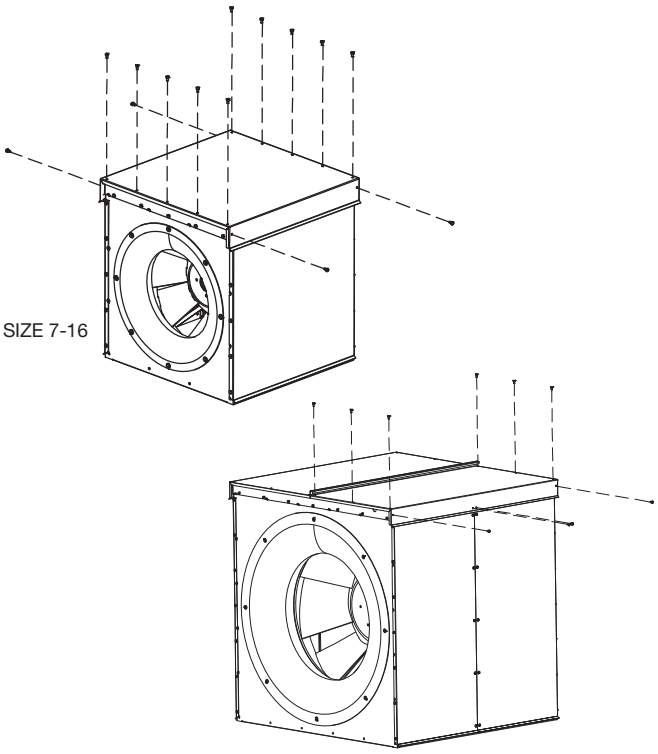


2. Connect wiring to motor leads in junction box on top of the fan, replace the junction box cover.
3. Connect wiring to disconnect or power supply
4. Junction boxes (and "Dial on Fan" if Vari-Green®) on top of the fan are inaccessible when outdoor cover is fully installed.

STEP 9 - Install Top Panel(s)

Size 7-16, install top panel of outdoor cover to fan using provided self-tapping sheet metal screws.

Sizes 18-33, install the first top panel with single return flange using provided self-tapping sheet metal screws (reference number 1 below).



SIZE 7-16

SIZE 18-33

1. Install the second top panel with double return flange by hinging it around the first panel as shown.
2. Use self-tapping sheet metal screws to mount second panel, filling all holes.

NOTE: Take care not to damage the foam tape on these parts.

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 10) from the fan shaft so that a straight edge held tight to the wheel cone just touches the inlet cone. Refer to Figure 1.

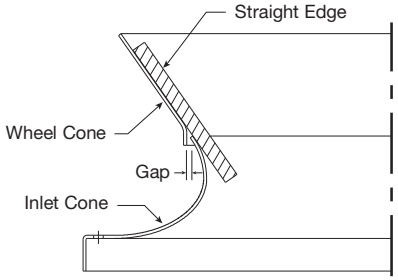


Figure 1

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	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 noises at the factory prior to shipment. If mechanical noise should develop, suggested corrective actions are offered in the Troubleshooting section (page 12).

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.

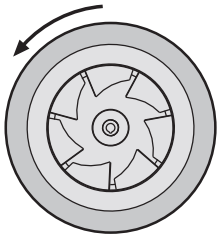


Figure 2

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.

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.

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 104ºF (40ºC), the grease should be replaced after 2,000 hours of running time.

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.

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.

Tapered Bushing Hub Installation and Removal

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

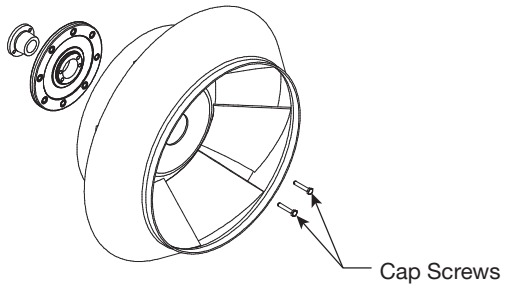


Figure 3

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 9. 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

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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
Excessive noise or vibration	Wheel unbalance	Clean all dirt off wheel. Check wheel balance, rebalance in place if necessary.
	Wheel improperly aligned and rubbing	Center wheel on inlet cone, see Figure 1 (page 9).
	Foreign objects in wheel or housing	Remove objects, check for damage or unbalance.
Reduced airflow	System resistance too high	Check system: Proper operation of backdraft or control dampers, obstruction in ductwork, clean dirty filters.
	Unit running backwards	Correct. See Operation (page 9), step 4, to correct wheel rotation.
	Excessive dirt buildup on wheel	Clean wheel.
	Improper wheel alignment	Center wheel on inlet cone, see Figure 1 (page 9).

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.

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EF-02

Installation, Operation and Maintenance Manual

EQUIPMENT: Greenheck Roof Exhaust Fan

PROJECT: Pleasant Valley Country Club – Club House Renovation

LOCATION: Little Rock, AR

MECHANICAL CONTRACTOR: Comfort Systems, USA

SUBMITTED BY: Forrest Moseley
forrest@airetechcorp.com
(501) 280-0404

Job # 73347

7631 NORTHSHORE PLACE
NORTH LITTLE ROCK, ARKANSAS 72118
Voice (501)280-0404 ● Fax (501)280-9200

GREENHECK
Building Value in Air.

Document 471560
Model CUE Direct Drive
Model CUBE Belt Drive
Upblast Centrifugal Roof Exhaust

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.

Direct Drive Upblast Centrifugal Exhaust Fan

These fans are specifically designed for roof and wall mounted applications. The maximum continuous operating temperature for fan sizes 099-300 is 400°F *(204°C)* and for fan sizes 060-095 is 130°F *(54°C)*. Direct drive fans are available with nominal wheel diameters ranging from 9 to 30 inches *(229 to 762 mm)* (060-300 unit sizes). Each fan shall bear a permanently affixed manufacturer's embossed metal nameplate containing the model number and individual serial number.

Belt Drive Upblast Centrifugal Exhaust Fan

These fans are specifically designed for roof and wall mounted applications. The maximum continuous operating temperature is 400°F *(204°C)*. Belt drive fans are available with nominal wheel diameters ranging from 10 to 48 inches *(254 to 1219 mm*) (099-480 unit sizes). Each fan shall bear a permanently affixed manufacturer's embossed metal nameplate containing the model number and individual serial number.

NOTE: Both direct and belt drive units are capable for roof or wall mounting without selecting it up to size 130. Sizes 140-300 will need to be selected for sidewall mount. *Your accessories will change when you select sidewall mount.*

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 is 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 Electrical 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. 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 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 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. Sometimes it is not possible that all items for the unit be shipped together due to availability of transportation and truck space. Confirmation of shipment(s) must be limited to only items on the bill of lading.

IMPORTANT

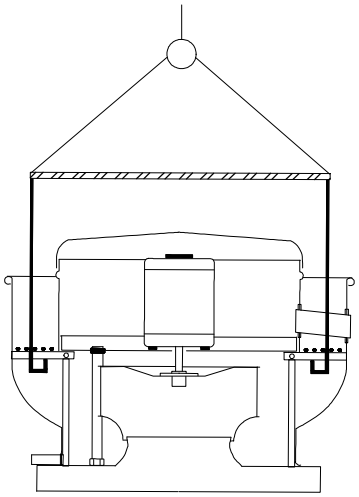
Do not lift by the fan hood. Avoid lifting fans in a way that will bend or distort fan parts. Never pass slings or timbers through the venturi of fan. Fans with special coatings or paints must be protected in handling to prevent damage.

Handling

Direct and Belt Drive Units

Lift Direct Drive unit on to the roof utilizing hooks under the horizontal supports. Evenly space the hooks using a minimum of four lifting straps. Use a spreader bar to ensure the straps do not come in contact with the unit, see Figure 1.

Figure 1



When lifting a Belt Drive unit onto the roof, use either the four lifting points on the drive frame or the two lifting points on the bearing plate if present, see Figure 2 for lifting points. Access to the drive frame is accomplished by removing the screws pointed out in Figure 3. The cover can then be removed and placed on a flat surface in an area protected from strong winds.

Figure 2

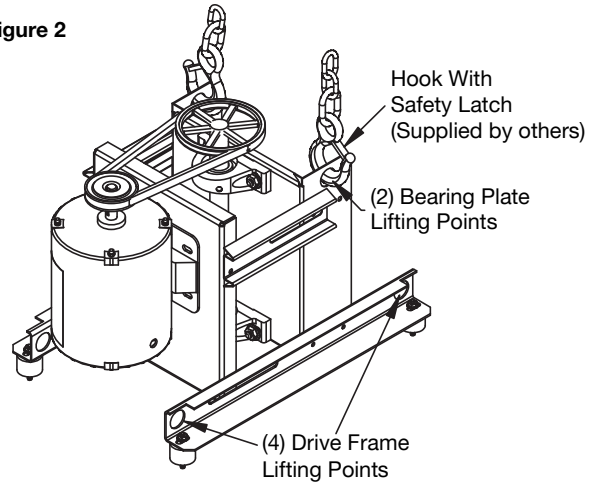
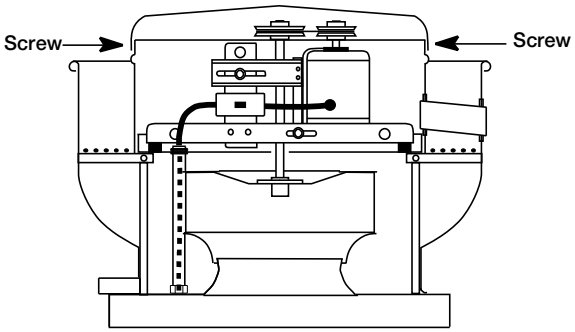


Figure 3



When the Direct and/or Belt Drive unit is on the roof, move fan to desired location using lifting points and fasten securely through mounting holes in base. Shims may be necessary depending upon roofing material thickness.

The motor amperage and voltage ratings must be checked for compatibility to supply voltage prior to final electrical connection. For Direct and/or Belt Drive installations, the electrical supply should be routed through the conduit chase located between the curb cap and the bottom of the motor compartment or through the breather tube. 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.

Indoor

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 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.

Outdoor

Fans designed for outdoor applications may be stored outdoors, if absolutely necessary. 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 wheels 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 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.

IMPORTANT

Installation, troubleshooting and parts replacement are to be performed only by qualified personnel. Consult and follow all applicable national, state and local codes. They will supersede this document.

Dimensional Data

Direct Drive

Model Size	Curb Cap	Damper	Roof/Wall Opening	Wall Opening with a curb	**Approx. Weight
060, 070	17 *(432)*	8 *(203)*	13½ *(343)*	17 *(432)*	29 *(13)*
080, 090, 095	19 *(483)*	10 *(254)*	15½ *(393)*	19 *(483)*	40 *(18)*
099, 100, 101*, 120, 121*, 130, 131*	19 *(483)*	12 *(305)*	15½ *(393)*	19 *(483)*	67 *(30)*
140, 141*, 160, 161*	22 *(559)*	16 *(406)*	18½ *(470)*	22 *(559)*	90 *(41)*
180, 200, 200HP	30 *(762)*	24 *(610)*	26½ *(673)*	30 *(762)*	142 *(64)*
240, 240HP	34 *(864)*	24 *(610)*	30½ *(775)*	N/A	175 *(79)*
300, 300HP	40 *(1016)*	34 *(864)*	36½ *(927)*	N/A	313 *(142)*

Belt Drive

Model Size	Curb Cap	Shaft Bearings	Damper	Roof/Wall Opening	Wall Opening with a curb	**Approx. Weight
099, 100, 101*, 100HP, 101HP*, 120, 121*, 130, 131*	19 *(483)*	¾ *(19)*	12 *(305)*	15½ *(393)*	19 *(483)*	66 *(30)*
140, 141*, 140HP, 141HP*, 160, 161*, 160HP, 161HP*	22 *(559)*	¾ *(19)*	16 *(406)*	18½ *(470)*	22 *(559)*	87 *(39)*
160XP, 161XP*	22 *(559)*	1 *(25)*	16 *(406)*	18½ *(470)*	22 *(559)*	87 *(39)*
180	30 *(762)*	¾ *(19)*	24 *(610)*	26½ *(673)*	30 *(762)*	126 *(57)*
180HP	30 *(762)*	1 *(25)*	24 *(610)*	26½ *(673)*	30 *(762)*	126 *(57)*
200	30 *(762)*	¾ *(19)*	24 *(610)*	26½ *(673)*	30 *(762)*	142 *(64)*
200HP	30 *(762)*	1 *(25)*	24 *(610)*	26½ *(673)*	30 *(762)*	142 *(64)*
220, 220HP, 240, 240HP, 240XP	34 *(864)*	1 *(25)*	24 *(610)*	30½ *(775)*	34 *(864)*	175 *(79)*
300, 300HP, 300XP	40 *(1016)*	1 *(25)*	34 *(864)*	36½ *(927)*	40 *(1016)*	313 *(142)*
360, 360HP, 360XP	46 *(1168)*	1¼ *(32)*	40 *(1016)*	42½ *(1080)*	N/A	440 *(200)*
420	52 *(1321)*	1¼ *(32)*	46 *(1168)*	48½ *(1232)*	N/A	578 *(262)*
480	58 *(1473)*	1½ *(38)*	52 *(1321)*	54½ *(1384)*	N/A	675 *(306)*

- All dimensions are in inches *(millimeters)*.
- * Previous size, no physical product change with new size
- ** Approximate weight shown in lbs. *(kg.)* is the largest cataloged open drip proof motor.
- "Curb Cap" is the inside dimension of the curb cap
- The roof curb should be 1½ in. *(38 mm)* less than the curb cap to allow for roofing and flashing.
- Roof/wall opening is a square dimension

Installation

General Ventilation Installation

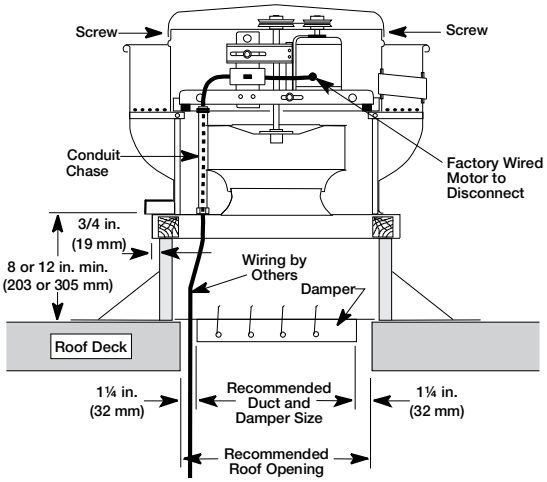


Figure 4 - Typical Roof Mounting Installation

1. On the roof surface, cut an appropriate sized hole and follow manufacturer's instructions on curb installation. Caulk and flash the curb to ensure a water tight seal.
2. If unit is equipped with a backdraft damper, it should be installed now.
3. Remove motor cover. Access to the motor compartment is accomplished by removing the screws as shown in Figure 3, page 2.

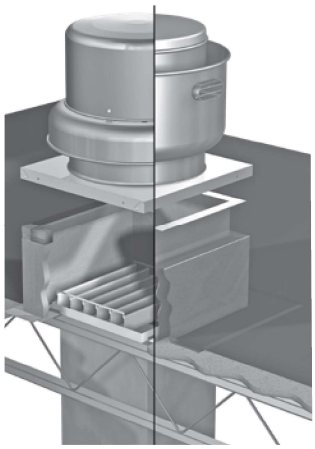


Figure 5 - Roof Curb Installation

4a. On **belt drive** fans, use the lifting lugs on the drive frame or bearing plate to lift and place the unit on top of roof curb. Refer to Figure 2, page 2.

4b. On **direct drive** fans, lift and place the unit on top of roof curb using hooks under the horizontal supports. Refer to Figure 1, page 2.

5. Secure fan to curb using a minimum of eight lag screws, metal screws or other suitable fasteners. Shims may be required depending upon curb installation and roofing material.
6. Verify power line wiring is de-energized before connecting fan motor to power source.
7. For commercial kitchen and UL Listed emergency smoke control applications, the electrical supply must enter the motor compartment through the breather tube. For other non-flammable applications, the electrical supply can be routed through the conduit chase between the curb cap and the bottom of the motor compartment.
8. Connect power supply wiring to the motor as indicated on the motor nameplate or terminal box cover. Check the power source for compatibility with the requirements of your equipment.
9. Check fan wheel for free rotation, recenter if necessary. Check setscrew(s) for tightness.
10. Check all fasteners for tightness.
11. Mount and wire safety disconnect switch under motor cover. Wire control switches at ground level, refer to Figure 6.
12. Replace motor cover.

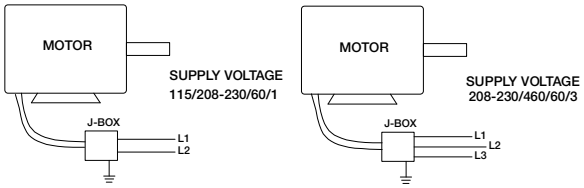
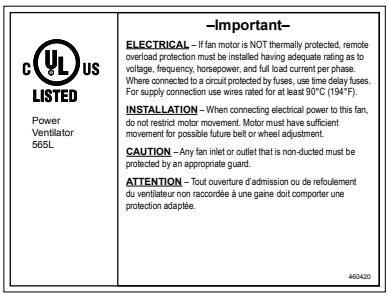


Figure 6 - Typical Wiring Diagram

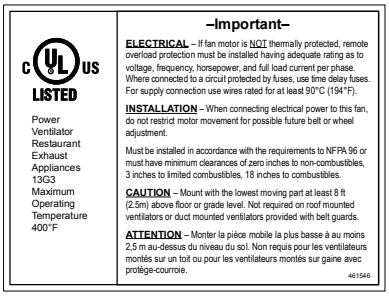
Vari-Green® Wiring

For Vari-Green wiring refer to the Vari-Green Motor and Controls Installation, Operation and Maintenance Manual for complete wiring and operation instructions.

Representation of UL Listed Power Ventilator label



Representation of UL Listed Power Ventilator Restaurant Exhaust Appliances label



Sidewall Mounting Installation

IMPORTANT		
Sidewall Mount Availability		
Fan Size	*060-130*	*140-300*
CUE	Yes	Yes (if configured)
CUBE	Yes	Yes (if configured)
Your accessories will change when you select sidewall mount.		

1a. **Curb**: Cut an appropriate sized hole in the wall for either through wall (recommended) or exterior face mount and follow the manufacturer's instructions on curb installation.

1b. **Wall bracket**: Cut an appropriate sized hole in the wall for exterior face mounting. If unit is equipped with a backdraft damper, it should be installed in the ductwork/wall opening now.

2. Mount the curb or wall bracket to the wall with a minimum of eight 3/8 inch fasteners around the flange. Caulk and flash the curb or wall bracket to ensure a watertight seal.

3. **Curb only**: If unit is equipped with a backdraft damper, it should be installed now.

4. Lift the fan into place. Do NOT support the unit by the hoodband during installation.

5a. **Curb**: Orient fan so the grease trough is downward and secure fan to curb using a minimum of eight lag screws, metal screws or other suitable fasteners.

5b. **Wall bracket**: Orient fan so the grease trough is downward and secure fan to bracket using the fasteners provided.

6. Follow steps 6 through 12 of General Ventilation Installation instructions on page 4.

NOTE: If using any type of hinging, your fan must be a minimum of 8 inches away from the wall.

NOTE: Do not install your fan more than 12 inches away from the wall.

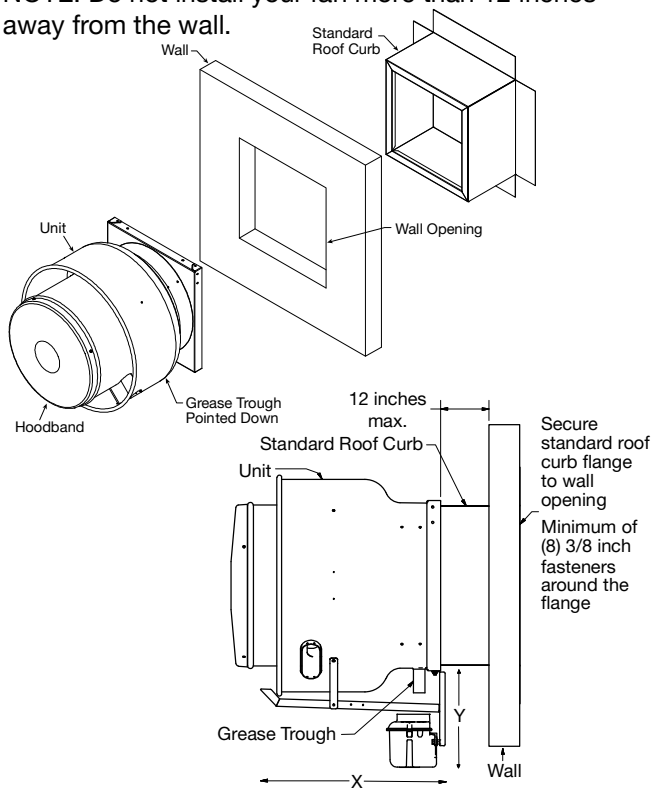


Figure 7 - Typical Sidewall Mounting Installation (Through Wall)

Grease Pan Kit Dimensions		
Fan Size	X (in.)	Y (in.)
99-130	21.5	13.5
140-160	23.5	13.3
180-200	29.5	17.5
220-240	32.5	18.5
300	33.0	19.5

Commercial Kitchen Installation

Commercial kitchen installations must comply with NFPA 96. Check local and national codes for these installations and consult local code authorities for other specific requirements.

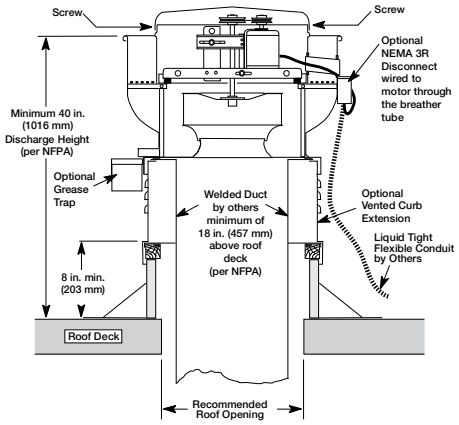


Figure 8
Typical Roof Mounting Installation

1. On the roof surface, cut an appropriate sized hole and follow manufacturer's instructions on curb installation. Caulk and flash the curb to ensure a watertight seal.
2. If unit is equipped with a backdraft damper. DO NOT install it.

Perform steps 3 - 12 of General Ventilation Installation.

IMPORTANT
The size of the duct must be equal to or larger than the inlet opening of the fan.
To comply with NFPA 96, the fan discharge must be a minimum of 40 in. *(1016 mm)* above the roof surface and a minimum of 10 ft. *(3048 mm)* from any building air intake.
Per NFPA 96, ductwork to an upblast discharge exhaust fan must be constructed of and supported by carbon steel not less than No. 6 MSG *(1.52 mm)* or stainless steel not less than No. 18 MSG *(1.21 mm)* in thickness. Duct must also extend a minimum of 18 in. *(457 mm)* above the roof surface.
Ensure that a minimum of 500 ft/min of air velocity through the duct is maintained per NFPA 96, clause 8.2.1.1, 2014 edition and UL 762, Issue #7, clause 6.2, October 14, 2013.
The following accessories may be required by NFPA 96 depending upon installation: Grease Trap, Hinge Kit or Hinged Base, Clean-Out Port, and Vented Curb.
Minimum duct velocities must be maintained in kitchen exhaust applications. If a speed controller is used, ensure compliance with all applicable codes.

Grease Trap Installation

The polypropylene grease trap is designed to collect grease residue and avoid drainage onto roof surface. Follow all local codes, as well as the National Fire Protection Agency (NFPA) where applicable.

NFPA 96: Upblast fans shall have a drain directed to a readily accessible and visible grease receptacle not to exceed 1 gal. *(3.8L)*

Refer to Document 476370 - Grease Trap Installation, Operation and Maintenance Manual for parts list and specific installation instructions.

Grease Trap Maintenance

Regular inspection of grease trap is recommended. Depending on the amount of grease discharged through the fan, the grease trap should be cleaned regularly to ensure proper operation.

- Check grease absorber (if included) every month. Replace grease absorber after every cleaning and/ or as needed between cleanings.
- Replacement grease absorbers (P/N 476084) can be ordered from your local representative.

Hinge Installation

NFPA 96: Upblast exhaust fans shall be supplied with a hinge.

Refer to listed Installation, Operation and Maintenance Manuals for parts list and specific installation instructions:

Document 481937 - Sidewall Mount Hinge Kit
Document 481366 - Bracket Hinge Kit
Document 462865/462866 - Hinge Kit

UL Listed Emergency Smoke Control Installation

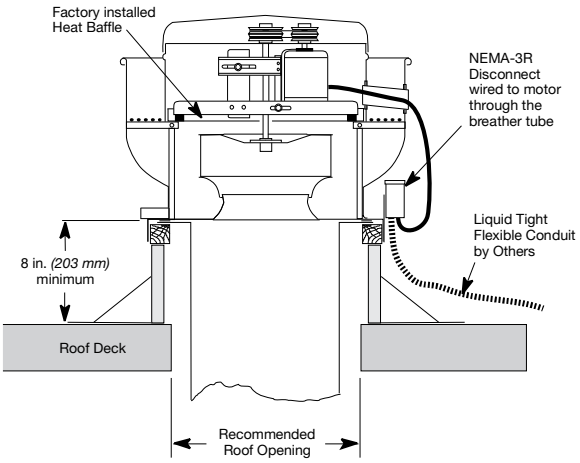


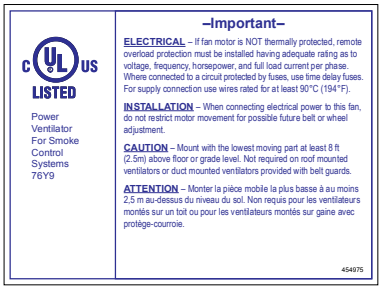
Figure 9 - Typical Roof Mounting Installation

Electrical Connection

For **belt drive** units in emergency smoke removal installations, the motor's amperage and voltage rating must be checked for compatibility to the supply voltage prior to final electrical connection. Also, the motor itself cannot have thermal overload protection.

The electrical supply must enter the motor compartment through the breather tube and the disconnect must be mounted outside the fan's motor compartment. Emergency smoke removal fans may also require an isolated power supply so that if power is cut to the building in the event of a fire, the fan will continue to operate.

Check the local and national electrical codes for emergency smoke removal fans. Consult local code authorities for your specific requirements.



Representation of UL Listed Power Ventilator for Smoke Control Systems label

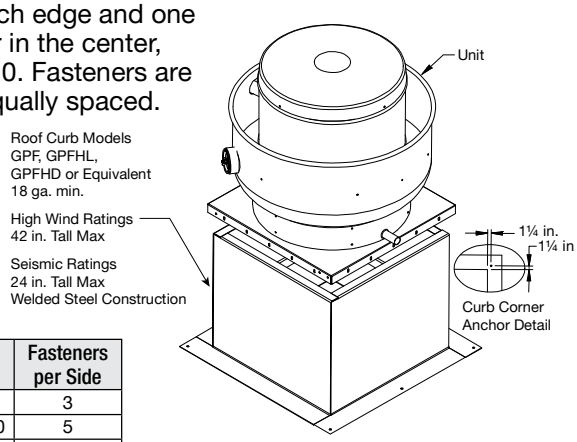
Mounting for Severe Duty Installation

IMPORTANT

Only qualified installers should perform this work. Manufacturer assumes no liability for damages resulting from installation.

Installation instructions for seismic ratings are only recommendations. Final design must be determined by Structural Engineer of Record (SEOR) including requirements for curb construction, mounting of unit to curb and mounting of curb to structure.

Fan to Curb Mounting: 5/16 inch *(7.9 mm)* self-drilling fasteners are to be installed on each side of fan with one fastener 4 inches *(102 mm)* from each edge and one fastener in the center, Figure 10. Fasteners are to be equally spaced.



Fan Size	Fasteners per Side
≤ 161	3
180 to 240	5
≥ 300	9

Figure 10 - Fan to Curb Mounting

Optional Hinged Base Mounting: For installations that include the optional hinged base accessory, the fan must be secured to the hinged base and curb using the correct number of fasteners as shown in the "Fan to Curb Mounting" section. All fasteners must be installed through the curb cap of the fan, the hinged base, and the curb. All fasteners must be reinstalled after each time the fan is hinged open, see Figure 11.

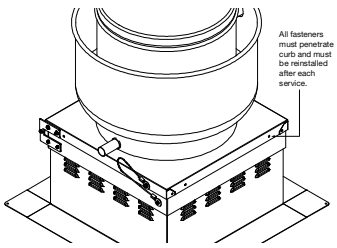


Figure 11 - Fasteners

Curb to Deck Mounting: Fasteners need to be located on all four sides of the curb, Figures 12a and 12b.

Figure 12a

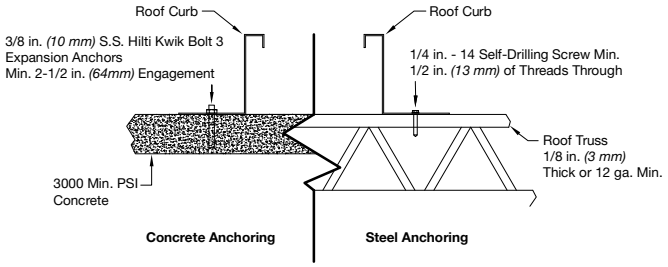
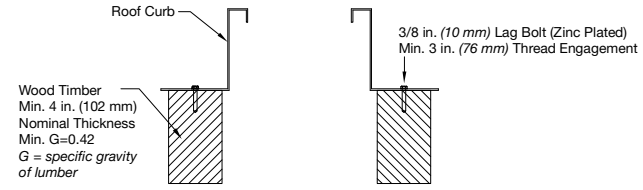


Figure 12b



Timber Anchoring

	High Wind Ratings				Seismic Ratings		
			Fasteners			Fasteners	
	Fan Size	Curb Cap Size inches *(millimeters)*	Per Side	Total	Fan Size	Per Side	Total
Steel	≤ 161	17x17 to 22x22 *(432x432 to 559x559 mm)*	3	12	060-240	2	8
	> 161	26x26 to 40x40 *(660x660 to 1016x1016 mm)*	4	16	300-360	3	12
					420-480	5	20
Concrete	≤ 161	17x17 to 22x22 *(432x432 to 559x559 mm)*	3	12	060-240	2	8
	> 161	26x26 to 40x40 *(660x660 to 1016x1016 mm)*	3	12	300-360	3	12
					420-480	5	20
Wood	≤ 161	17x17 to 22x22 *(432x432 to 559x559 mm)*	3	12	060-240	2	8
	> 161	26x26 to 40x40 *(660x660 to 1016x1016 mm)*	4	16	300-360	3	12
					420-480	5	20

All dimensions are in inches *(millimeters)*.

Pre-Starting Checks

1. Check all fasteners and setscrews for tightness. The wheel should rotate freely and be aligned as shown in Figure 13.

Model Type		Model Size	G - Overlap inch *(mm)*	H - Gap inch *(mm)*
Direct	Belt			
X	–	060-095	–	3/32 *(2)*
X	X	099-161	1/4 *(6)*	–
X	X	180-300	1/2 *(13)*	–
–	X	360-480	3/4 *(19)*	–

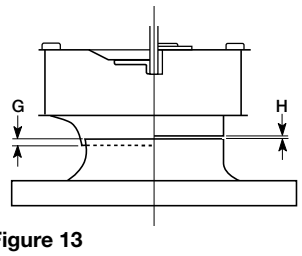


Figure 13
Wheel Overlap and Gap Dimension

2. Wheel position is preset and the unit is test run at the factory. Movement may occur during shipment and realignment may be necessary.

   Centering the wheel can be accomplished by loosening the bolts on the support pan and moving support pan until wheel is properly aligned. For units with drive frame mounting, loosen the bolts holding the drive frame to the vibration isolators and reposition the drive frame if additional movement is needed for wheel alignment.

   Wheel and inlet cone overlap can be adjusted by loosening the setscrews in the wheel hub and moving the wheel to the desired position. For direct and belt drive models with wheel hubs and shaft pulleys utilizing tapered bushing interface, reference page 9 for tapered bushing removal and move the wheel to the desired position.

3. Check wheel rotation (viewing from the shaft side) by momentarily energizing the unit. Rotation should be clockwise as shown in Figure 14 and correspond to the rotation decal on the unit. If wheel rotation is incorrect, reverse two of the wiring leads or check motor wiring for single phase. Fan RPM should be checked and verified with a tachometer.

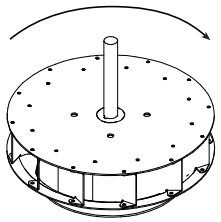


Figure 14

WARNING

Correct direction of wheel rotation is critical. Reversed rotation will result in poor air performance, motor overloading and possible motor burnout.

AVERTISSEMENT

La turbine doit impérativement tourner dans le bon sens. Une rotation en sens inverse entraînerait de mauvaises performances de soufflage, une surcharge du moteur voire un grillage du moteur.

Belt Drive Pre-Starting Belt Tension Checks

4. Always loosen tension enough to install belts without stretching. Do not force belt(s) *see* Figure 15. Forcing belts will break the cords and cause belt failure.

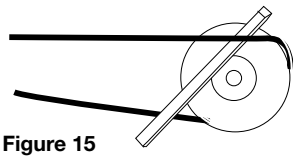


Figure 15

5. For units with two groove pulleys, adjust so the tension is equal in both belts.
6. If adjustments are made, it is very important to check the pulleys for proper alignment. Misaligned pulleys lead to excessive belt wear, vibration, noise and power loss, see Figure 16.

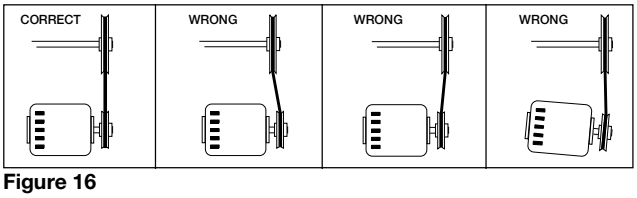


Figure 16

7. Belt tension can be adjusted by loosening four fasteners on the drive frame, see Figure 17. The motor plate slides on the slotted adjusting arms and drive frame angles in the same manner.

   Four (4) fasteners in total.

   Identical fasteners on opposing side must also be loosened.

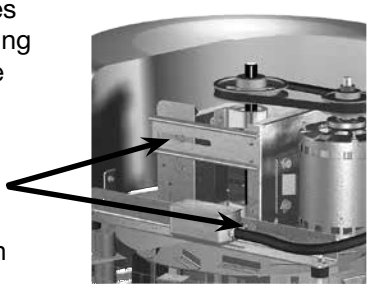


Figure 17

8a. **Sizes 099-160:** Belts should be tensioned just enough to prevent slippage at full load. Belts should have a slight bow on the slack side while running at full load; see Figure 18a.

8b. **Sizes 180-480:** Belt tension should be adjusted to allow 1/64 in. *(0.397 mm)* of deflection per inch of belt span. For example, a 15 in. *(381 mm)* belt span should have 15/64 in. *(5.95 mm)* (or about 1/4 in. *(6 mm)*) of deflection with moderate thumb pressure at mid-point between pulleys, see Figure 18b.

Figure 18a

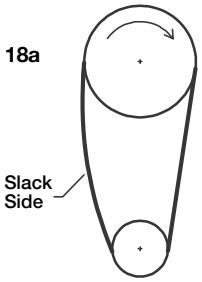
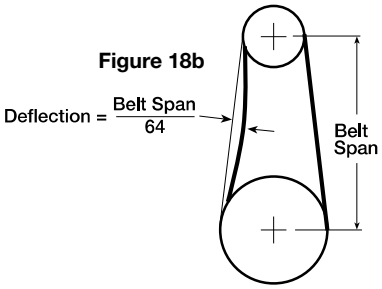


Figure 18b



9. The adjustable motor pulley is factory set for the RPM specified. Speed can be increased by closing or decreased by opening the adjustable motor pulley.
10. Any increase in speed represents a substantial increase in the horsepower required by the unit.
11. Motor amperage should always be checked to avoid serious damage to the motor when speed is varied.

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

IMPORTANT
Over tightening belts will cause excessive bearing wear and noise. Too little tension will cause slippage at startup and uneven wear.

Operation

1. Before starting up or operating fan, check all fasteners for tightness. In particular, check the setscrews in the wheel hub (or the tapered bushing and pulleys if applicable).
2. While in the OFF position or before connecting the fan to power, turn the fan wheel by hand to be sure it is not striking the venturi or any obstacle.
3. Start the fan and shut it off immediately to check rotation of the wheel with directional arrow in the motor compartment, reference Figure 14.
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.

IMPORTANT
Adjust (tighten) belt tension after the first 24-48 hours of operation.

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. On belt drive unit only, inspect belt alignment and tension. Adjust and tighten as necessary.

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.

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

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.

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

IMPORTANT

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

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.

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 manufacturer's recommendations. Where motor temperatures do not exceed 104ºF *(40ºC)*, the grease should be replaced after 2,000 hours of running time as a general rule.

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.

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

- When installing fans for restaurant exhaust applications follow NFPA 96 for cleaning fans.
- Grease containers must be emptied at regular intervals to prevent overflow.

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

Tapered Bushing Hub Installation and Removal

For wheel hubs and shaft pulleys utilizing a tapered bushing interface, follow this procedure for installation and removal. There are two possible set ups for the tapered bushing, both have the same procedure, but orientation of the hub varies.

Tapered 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 the section views and examples of Figures 19-22.
3. **Standard Mounting:** Take the two socket head cap screws that were removed and install them into the visibly threaded holes on the wheel hub.
   Reverse Mounting: Install the two socket head cap screws into the visibly threaded holes of the bushing flange.
4. Once both socket head cap screws are installed, tighten them an eighth of a turn at a time, alternating between the two until the hub comes loose from the bushing.

Standard Mounting	Reverse Mounting

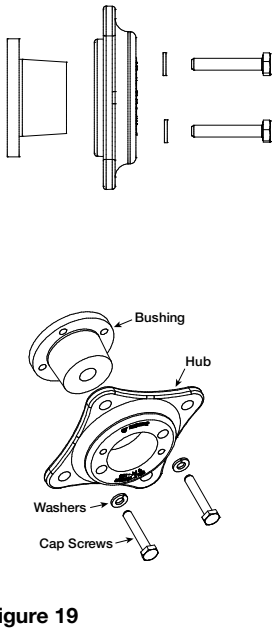
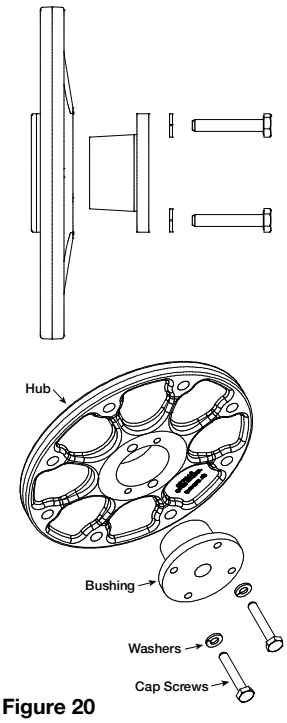

	

Figure 19	**Figure 20**
	
Figure 21 Standard Bushing Orientation	**Figure 22** Reverse Bushing Orientation

Bushing Installation

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. For both standard and reverse mounting styles, the socket head cap screws are adjustable from the inlet of the fan.
2. **Standard Mounting:** 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.
   Reverse Mounting: Slide the wheel and hub assembly onto the fan shaft followed by the bushing and shaft key. 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 tapered bushing with the threaded holes of the hub.

3. Install the two bushing socket head cap screws into the aligned holes by hand (or without excessive torque) until the heads of the socket head cap screws are seated against the mating surface.
4. Adjust the height of the wheel in the fan relative to the inlet venturi then tighten the two socket head cap screws an eighth turn at a time in an alternating fashion and to a torque of 10 ft-lbs.

Belt and Bearing Maintenance

1. Belts tend to stretch after a period of time. They should be checked periodically for wear and tightness. When replacing belts, use the same type as supplied with the unit.
2. Matched belts should always be used on units with multi-groove pulleys.
3. For belt replacement, loosen tensioning device enough to allow removal of the belt by hand.
4. Once installed, adjust belts as shown in "Pre-Starting Checks."
5. To ensure tightness, check pulley setscrews. Proper keys must be in keyways.
6. Fan RPM should not be readjusted. Only use pulleys of identical size and type when replacing pulleys.
7. Shaft bearings can be classified in two groups: relubricating and non-relubricating. All non-relubricating bearings on belt drive fans are factory lubricated and require no further lubrication under normal use (between -20º to 180ºF *(-29º to 82ºC)* in a relatively clean environment).
8. On belt drive fans, the standard cast pillow block bearings are factory lubricated and are provided with external grease fittings. Annual lubrication is recommended, or more frequently if needed, see Table 1. Do not over-grease. Use only one or two shots of lubricant with a hand gun. Maximum hand gun rating is 40 psi. Rotate bearings during lubrication where good safety practice permits. Caution should be employed to prevent over packing or contamination.
9. Units installed in hot, humid or dirty locations should be equipped with special bearings. These bearings will require frequent lubrication. Caution should be employed to prevent over packing or contamination.
10. Grease fittings should be wiped clean. The unit should be in operation while lubricating bearings. Extreme care should be used around moving parts.
11. Grease should be pumped in very slowly until a slight bead forms around the seal. A high grade lithium base grease should be used (see Table 2).
12. During the first few months of operation, check bearing set screws periodically to ensure tightness.
13. If unit is to be left idle for an extended period, remove belts and store in a cool, dry place to avoid premature belt failure.

Recommended Bearing Lubrication Frequency in Months

NOTE

If unusual environment conditions exist (extreme temperature, moisture or contaminants) more frequent lubrication is required.

A good quality lithium base grease, conforming to NLGI Grade 2 consistency, such as those listed in Table 2 may be used.

Table 1: Suggested Fan Bearing Lubrication Intervals

Interval (months)	Type of Service
1 to 3	Heavy duty in dirty, dusty locations; high ambient temperatures; moisture laden atmosphere; vibration.
3 to 6	12 to 24 hours per day, heavy duty, or if moisture is present
6 to 12	8 to 16 hours per day in clean, relatively dry atmosphere
12 to 18	Infrequent operation or light duty in clean atmosphere

Table 2: Grease Manufacturers

Manufacturer	Grease (NLGI #2)
U.S. Electric Motors	Grease No. 83343
Chevron U.S.A. Inc	Chevron SRI Grease #2
Mobil Oil Corporation	Mobilith
	Mobil 532
Texaco, Inc.	Premium BRB #2
	Texaco Multifak #2
Amoco Oil Co.	Rykon Premium #2
Exxon	Unirex N2
Shell	B Shell Alvania #2

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.

NOTE

For replacement, the windband, vertical supports, drain trough and curb cap/venturi come as one complete assembly.

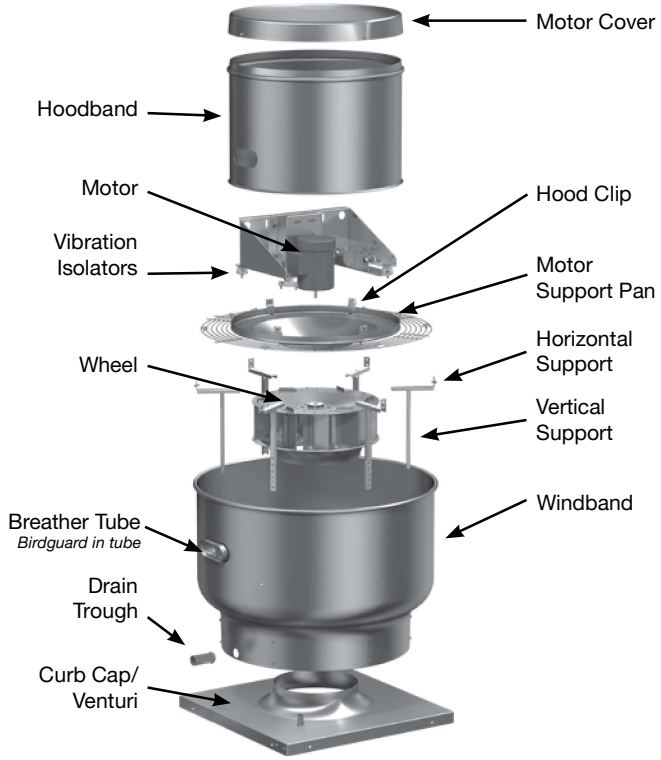
CAUTION

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.

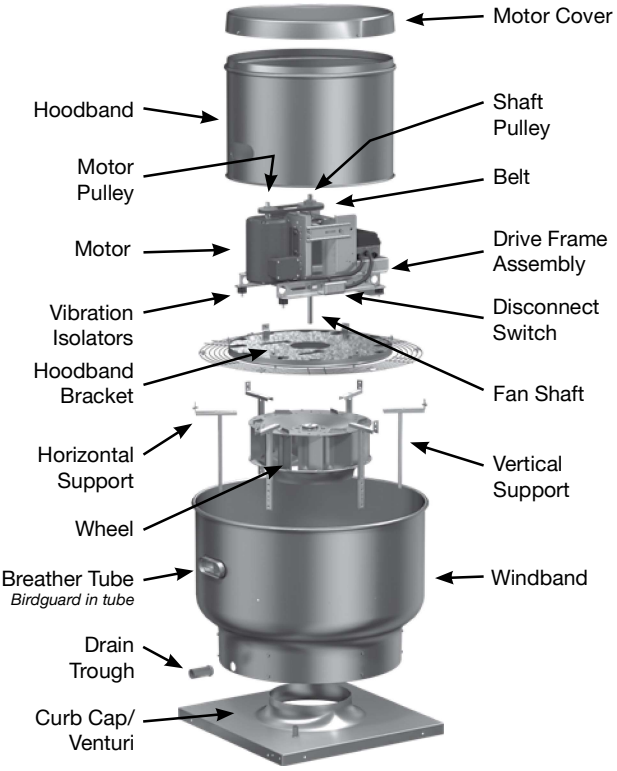
CAUTION

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.

Direct Drive

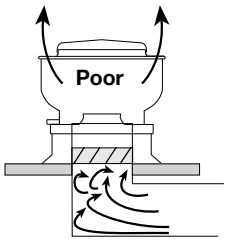


Belt Drive

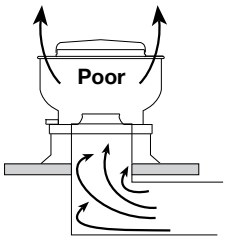


Fan Inlet Connections

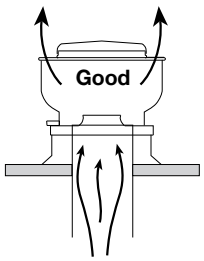
In order to ensure proper fan performance, caution must be exercised in fan placement and connection to the ventilation system. Obstructions, transitions, poorly designed elbows, improperly selected dampers, etc, can cause reduced performance, excessive noise and increased mechanical stress. For performance to be as published, the system must provide uniform and stable airflow into the fan.



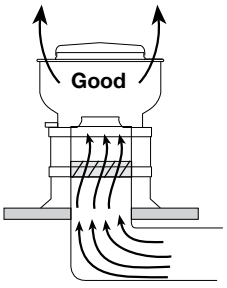
Dampers must open fully. Use motorized dampers in low airflow applications to reduce losses.



Avoid sharp turns or entrance conditions which cause uneven flow. Use turning vanes in elbows to reduce adverse effects.



Provide uniform airflow at fan inlet to ensure optimum performance.



Provide uniform airflow at fan inlet and through the damper to ensure optimum performance. Curb cap should be three wheel diameters from the radius. Use turning vanes in duct when possible.

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
Excessive noise or vibration	Wheel rubbing inlet	Adjust wheel and/or inlet cone. Tighten wheel hub or bearing collars on shaft.
	V-belt drive	Tighten pulleys on motor/fan shaft. Adjust belt tension. Align pulleys properly, see page 7, Figures 15 and 16. Replace worn belts or pulleys.
	Bearings	Replace defective bearing(s). Lubricate bearings. Tighten collars and fasteners.
	Wheel unbalance	Clean all dirt off wheel. Check wheel balance, rebalance in place if necessary.
	Belts too tight or too loose	Adjust tension, see page 8, Figures 18a and 18b.
	Wheel improperly aligned and rubbing	Center wheel on inlet, see page 7, Figure 13.
	Loose drive or motor pulleys	Align and tighten. See "Pre-Starting Checks", pages 7 and 8.
	Foreign objects in wheel or housing	Remove objects, check for damage or unbalance.
	Fan base not securely anchored	Secure properly.
	Motor hood loose and rattling	Tighten fasteners to secure the motor hood.
	Defective or loose motor bearings	Replace motor with same frame size, RPM-HP
High horsepower	Fan	Check rotation of wheel, see page 7, Figure 14. Reduce fan speed.
	Duct system	Resize ductwork. Check proper operation of face and bypass dampers. Check filters and access doors.
Fan does not operate	Electrical supply	Check fuses/circuit breakers. Check for switches off. Check for correct supply voltage.
	Drive	Check for broken belts. Tighten loose pulleys or belts.
	Motor	Ensure motor is correct horsepower and not tripping overload protector.
Motor overloads or overheats	Lubrication	Check for excessive or insufficient grease in the bearing.
	Mechanical	Replace damaged bearing. Relieve excessive belt tension. Align bearings. Check for bent shaft.
	Belt slippage	Adjust tension or replace bad belts, see pages 7 and 8.
	Over/Under line voltage	Contact power company.
	Incorrect wheel rotation	Check motor wiring, see page 4, Figure 6. Confirm wheel rotation, see page 7, Figure 14.
	Wheel RPM too high	Check drives or slow down fan by opening variable pitch pulley on motor shaft.
	Undersized motor	Check motor ratings with catalog speed and air capacity chart.
	Motor wired incorrectly	Check motor wiring to wiring diagram located on fan motor.
Reduced airflow	System resistance too high	Check system: Proper operation of backdraft or control dampers, obstruction in ductwork, clean dirty filters.
	Unit running backwards	Correct as shown see page 7, Figure 14.
	Excessive dirt buildup on wheels	Clean wheel, see page 9.
	Improper wheel alignment	Center wheel on inlet, see "Pre-Starting Checks".
	Dampers closed	Inspect and repair.
	Blocked duct/clogged filter	Clean or replace.
	Belt slippage	Replace and adjust tension.
	Speed too slow	Check for correct drives.

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.

Greenheck's Centrifugal Upblast and Sidewall Exhaust catalog provides additional information describing the equipment, fan performance, available accessories, and specification data.

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.

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EF-03 & EF-04

Installation, Operation and Maintenance Manual

EQUIPMENT: **Broan Fan**

PROJECT: **Pleasant Valley Country Club – Club House Renovation**

LOCATION: **Little Rock, AR**

MECHANICAL CONTRACTOR: **Comfort Systems, USA**

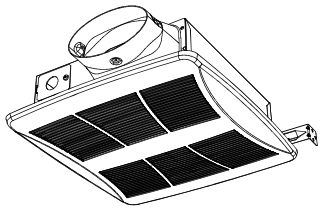
SUBMITTED BY: **Forrest Moseley**
forrest@airetechcorp.com
(501) 280-0404

Job # 73347

7631 NORTHSHORE PLACE
NORTH LITTLE ROCK, ARKANSAS 72118
Voice (501)280-0404 ● Fax (501)280-9200

BROAN®

VENTILATION FAN



MODEL LP510R

WARNING

TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

a). Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.

b). Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switching on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

c). Installation work and electrical wiring must be done by a qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction codes and standards.

d). Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturer's guideline and safety standards such as those published by the National Fire Protection Association (NFPA), and the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and the local code authorities.

e). When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.

f). Ducted fans must always be vented to the outdoors.

g). Acceptable for use over a tub or shower when connected to a GFCI (Ground Fault Circuit Interrupter) - protected branch circuit (ceiling installation only).

h). This unit must be grounded.

i). Not for Use in Kitchens.

j). To reduce risk of fire and to properly exhaust air, be sure to duct air outside – Do not vent exhaust air into spaces within walls or ceilings or into attics, crawl spaces, or garages.

k). WARNING: To Reduce The Risk Of Fire Or Electric Shock, Do Not Use This Fan With Any Solid-State Speed Control Device.

l). The fan must not be installed in a ceiling thermally insulated to a value greater than R40.

CAUTION

1. For general ventilating use only. Do not use to exhaust hazardous or explosive materials and vapors.
2. This product is designed for installation in ceilings up to a 12/12 pitch (45 degree angle). Duct connector must point up.
3. To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc. off power unit.
4. Please read specification label on product for further information and requirements.

CLEANING & MAINTENANCE

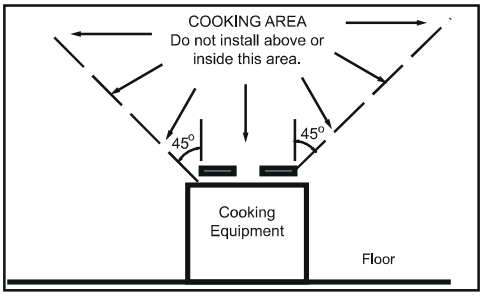
For quiet and efficient operation, long life, and attractive appearance - lower or remove grille and vacuum interior of unit with the dusting brush attachment.

The motor is permanently lubricated and never needs oiling. If the motor bearings are making excessive or unusual noises, replace the blower assembly (includes motor and impeller).

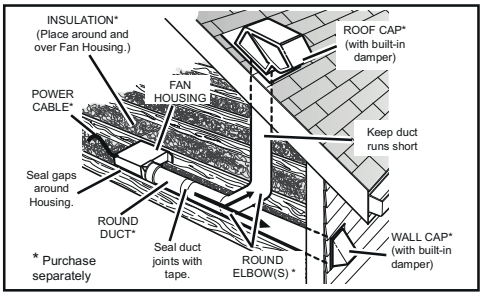
READ AND SAVE THESE INSTRUCTIONS
Installer: Leave this manual with the homeowner.

PLAN THE INSTALLATION

1. Do not use in a cooking area.



2. Two ways to connect ductwork to a factory-shipped unit.

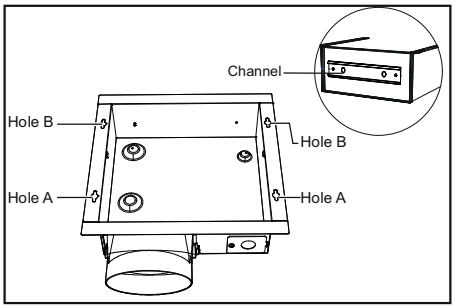


ASSEMBLY INSTRUCTIONS

1. Before installation, you need to know:

Screw A		ST4.2*13 mm
Screw B		ST4.2*25 mm
Hanger bar		13 3/8 in. (340 mm)

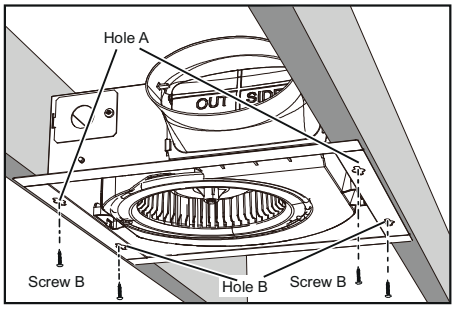
When installing contractor packs, make sure to install any optional modules such as speed controls or humidity sensors with the fan housing to ensure wiring is completed properly. Module and grille plugs come packaged with the optional accessory and must be installed with the fan housing.



2. Ceiling installation

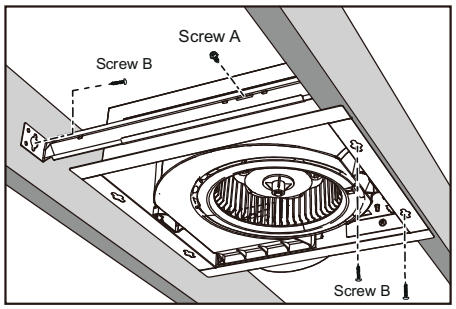
2a. Mount with mounting holes

Hold housing in place so that the housing contacts the bottom of the joist. Screw housing to joist through the hole A and hole B.



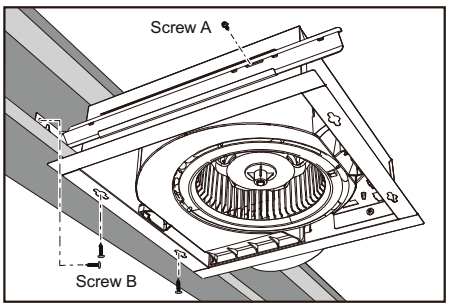
2b. Mount with hanger bar

Slide one hanger bar into the channel on the housing and adjust as needed to fit between framing. Hold housing in place so that the housing contacts the bottom of the joist. Screw housing to joist through the hole A and hole B. Screw the hanger bar onto the other side of joist through its hole.
Screw hanger bar to housing with screw A.



2c. Mount to I-joist

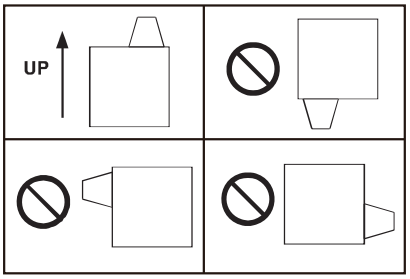
Slide hanger bar into the channel on the housing and adjust as needed to fit I-joist. Hold housing in place so that the housing contacts the bottom of joist. Screw housing to joist through the hole A and hole B. Screw the hanger bar onto the joist through its hole.
Screw hanger bar to housing with screw A.



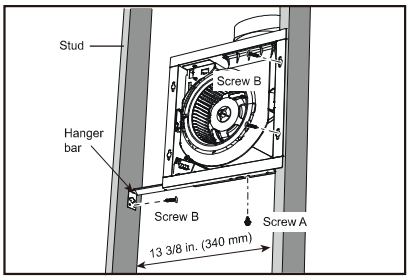
ASSEMBLY INSTRUCTIONS

3. Wall installation

3a. When the product is installed on the wall, the adaptor shall be faced upward.

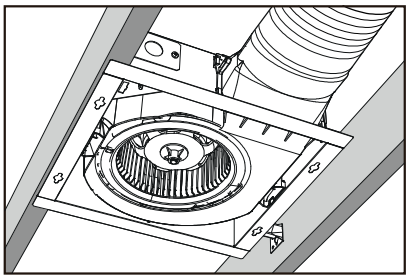


3b. Slide hanger bar into the channel on the housing. Hold housing in place so that the housing contacts the bottom of stud. Screw housing to stud through the hole A and hole B on the same side. Screw the hanger bar onto the opposite stud through its hole.
Screw hanger bar to housing with screw A.
The minimum installation distance between studs is 13 3/8 in. (340mm.)



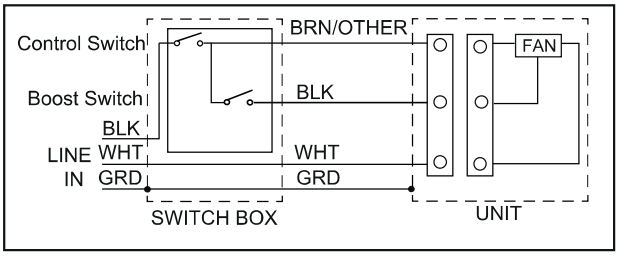
4. Install round ductwork

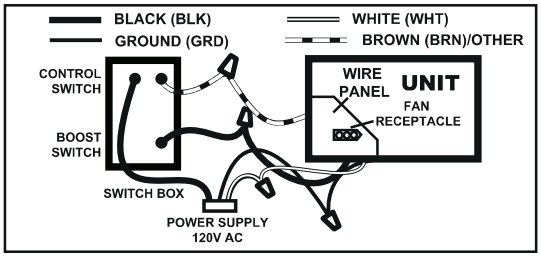
Connect the 4 in. round flexible ductwork (not included) to the damper/duct connector, and run the ductwork to a roof or wall cap (not included).
Using metal foil tape (not included), secure all the ductwork connections so that they are air tight. The ducting from this fan to the outside of building has a strong effect on the air flow, noise and energy use of the fan. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated air flow.



CONNECT ELECTRICAL WIRING

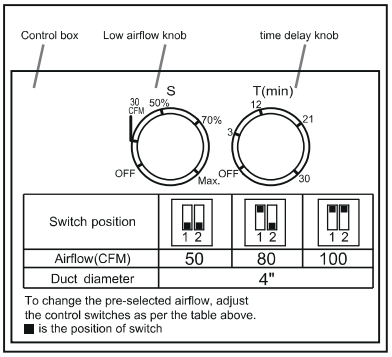
Run 120V AC house wiring to the location of the fan. Use only UL-approved connectors and UL-approved wire strain relief (not included) to attach the house wiring to the wiring plate. Refer to the wiring diagram, and connect the wires as shown.





OPERATION

See “Connect Wiring” for details.
The control box, located inside the fan housing, has three separate adjustments:
(1) The low airflow knob adjusts the continuous run lower airflow from 30 CFM up to the air flow rate of the high fan speed determined by the toggle switch setting.
The low speed is de-activated when set between OFF-30 CFM (factory set to OFF).
(2) The time delay knob is adjustable from 3 to 30 minutes and will switch the fan to the low speed setting after the Boost Switch is turned off for the set period of time.
The time delay setting is de-activated when set between OFF-3 mins (factory set to OFF).
(3) The toggle switch will adjust the upper fan speed setting from 50 to 100 CFM (factory set to 100 CFM).



To Turn Fan ON
Turn the Control Switch (according to the following “CONNECT ELECTRICAL WIRING”) ON.
• Fan will run at the certified high airflow rate if the Boost Switch is ON.
• Fan will run at the continuous run low airflow rate if the Boost Switch is OFF.
To Use Fan Time Delay Airflow Rate Change
1. Turn the Control Switch ON.
2. Turn the Boost Switch ON - fan will run at the certified high airflow rate.
3. When the Boost Switch is turned OFF, fan will continue to run at the certified high airflow rate until the time delay has elapsed (the delay time is user-adjustable from 3-30 minutes), and then will automatically change to the continuous run low airflow rate.
To Turn Fan OFF
Turn the Control Switch OFF.

Scan QR code for quick start guide.

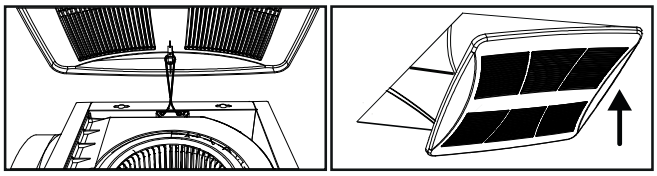
READ AND SAVE THESE INSTRUCTIONS
Installer: Leave this manual with the homeowner.

INSTALL GRILLE

Install ceiling material to complete the ceiling construction.

Then, cut around inside the fan housing.

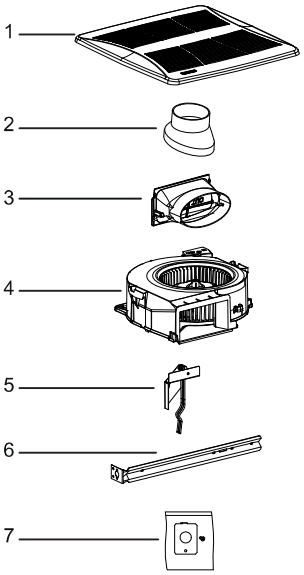
To attach the grille assembly to the fan housing, pinch the grille springs on the sides of the grille assembly, and position the grille into the housing with the grille springs in the appropriate slots. Push the grille assembly towards the ceiling to secure.



SERVICE PARTS

No.	Part No.	Name	Description
1	S1110513	Grille Assembly	Grille and springs
2	S1110515	Duct Reducer	4" Oval to 3"
3	S1110516	Duct Connector	Plastic
4	S1110521	Blower Assembly	Motor plate, motor, wheel, blower scroll and controller
5	S1110517	Wire Panel/Harness Assembly	Including wire
6	S1110519	Hanger Bar	1 piece
7	S1110520	Parts Bag	1 screw and 1 wiring plate

WARNING: Before replacing part, be sure to turn off power at power source.



WARRANTY

This warranty covers all defects in workmanship or materials for:
The mechanical and electrical parts contained in this product, for a period of 12 months, from the date of purchase. You must keep and be able to provide your original sales receipt as proof of the date of purchase. This warranty covers the original retail purchaser of this product. The manufacturer will repair or replace, in your home, any mechanical or electrical part which proves defective in normal household use for a period of 12 months.
THIS WARRANTY DOES NOT COVER:
• Damages from improper installation
• Damages from shipping
• Damages from misuse, abuse, accident, alteration, lack of proper care and maintenance
• Damages from service by persons other than an authorized dealer or service center.
• Labor, service, transportation and shipping charges for the removal of defective parts and for installation of a replacement part, beyond the initial 12-month period.
This warranty does not extend to fluorescent lamp starters and tubes.
THIS LIMITED WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
The remedy provided in this warranty is exclusive and is granted in lieu of all other remedies. This warranty does not cover incidental or consequential damages. Some states do not allow the exclusion of incidental or consequential damages, so this limitation may not apply to you. Some states do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

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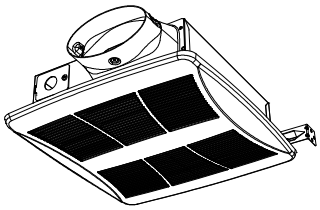
VENTILATEUR



MODÈLE LP510R

AVERTISSEMENT

AFIN DE RÉDUIRE LE RISQUE D'INCENDIE, DE DÉCHARGE ÉLECTRIQUE OU DE BLESSURES, RESPECTEZ CE QUI SUIT :

a). Utilisez cet appareil uniquement de la manière prévue par le fabricant. Si vous avez des questions, contactez le fabricant.

b). Avant de réparer ou de nettoyer l'appareil, éteignez celui-ci au panneau de service et verrouillez-le pour empêcher l'alimentation accidentelle. Lorsqu'on ne peut verrouiller au panneau de service, fixez de manière sécurisée et visible une étiquette d'avertissement à ce dernier.

c). L'installation et le câblage électrique doivent être effectués par une personne qualifiée conformément à tous les codes et normes applicables, y compris les codes et les normes de construction résistantes aux incendies.

d). L'air nécessaire pour une combustion appropriée et l'évacuation des gaz à travers la cheminée d'équipement de combustion à carburant pour éviter le contre-tirage. Suivez la ligne directrice du fabricant de l'équipement de chauffage et les normes de sécurité telles que celles publiées par la NFPA (*National Fire Protection Association*) et l'ASHRAE (*American Society for Heating, Refrigeration and Air Conditioning Engineers*) ainsi que les autorités locales.

e). Lors de la coupe ou du perçage dans les murs ou les plafonds, évitez d'endommager les câbles électriques et autres équipements dissimulés.

f). Les conduits de ventilateurs doivent toujours être évacués vers l'extérieur.

g). Peut être utilisé au-dessus d'une baignoire ou d'une douche lorsqu'il est branché à un DDFT (disjoncteur de fuite à la terre) - circuit de dérivation protégé (installation au plafond uniquement).

h). Cet appareil doit être mis à la terre.

i). Ne doit pas être utilisé dans la cuisine.

j). Pour réduire les risques d'incendie et pour évacuer l'air correctement, assurez-vous de canaliser l'air vers l'extérieur. Évitez d'évacuer l'air d'échappement dans les murs ou les plafonds ou dans les greniers, les vides sanitaires ou les garages.

k). AVERTISSEMENT : Pour réduire le risque d'incendie ou de choc électrique, n'utilisez pas ce ventilateur avec un dispositif de contrôle de vitesse à semi-conducteurs.

l). Le ventilateur ne doit pas être installé dans un plafond isolé thermiquement à une valeur supérieure à R40.

MISE EN GARDE

1. Uniquement pour une ventilation générale. Ne pas utiliser pour évacuer des matières et des vapeurs dangereuses ou explosives.
2. Cet appareil est conçu pour être installé dans des plafonds à pente de 12/12 (de 45 degrés). Le connecteur du conduit doit pointer vers le haut.
3. Pour éviter des dommages au roulement du moteur et des pales bruyantes ou déséquilibrées, évitez que la poussière de plâtre ou autres produits de construction s'accumule sur celles-ci.
4. Veuillez lire l'étiquette de spécification sur l'appareil pour de plus amples informations et conditions.

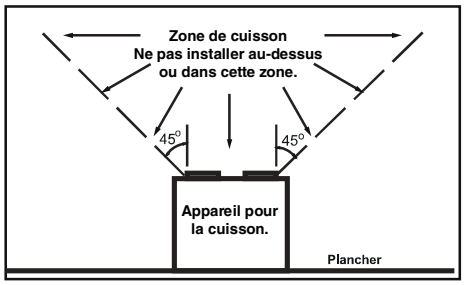
NETTOYAGE ET ENTRETIEN

Pour un fonctionnement silencieux et efficace, une longue durée de vie et une apparence attrayante, abaisser ou retirer la grille et aspirer l'intérieur de l'appareil avec une brosse à poussière. Le moteur est lubrifié en permanence et n'a jamais besoin d'huile. Si les roulements du moteur produisent des bruits excessifs ou inhabituels, remplacez le bloc moteur (incluant le moteur et la roue de ventilateur).

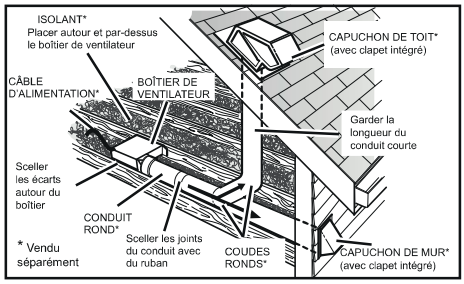
LIRE ET CONSERVER CES INSTRUCTIONS
Installateur : Laisser ce manuel au propriétaire.

PLANIFICATION DE L'INSTALLATION

1. Ne pas utilier dans une zone de cuisson.

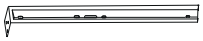


2. Deux façons de raccorder le conduit à un appreil pré-monté.

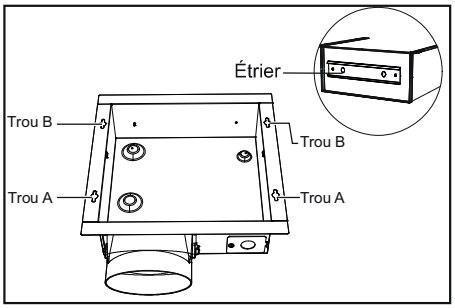


INSTRUCTIONS D'ASSEMBLAGE

1. Avant l' installation, vous devez savoir:

Vis A		ST4.2*13 mm
Vis B		ST4.2*25 mm
Barre de suspension		13 3/8 po (340 mm)

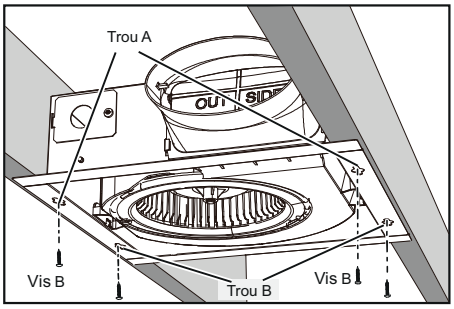
Lors de l'installation des ensembles pour entrepreneur, veillez à installer tous les modules optionnels tels que les régulateurs de vitesse ou les capteurs d'humidité avec le boîtier du ventilateur pour vous assurer que le câblage est correctement complété. Les fiches des modules et des grilles sont fournies avec l'accessoire optionnel et doivent être installées avec le boîtier du ventilateur.



2. Installation au plafond

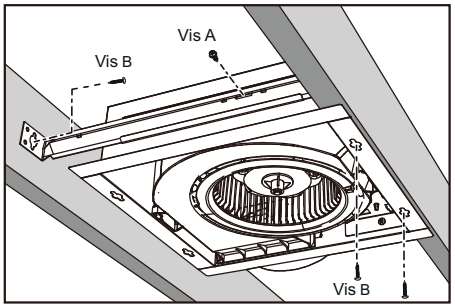
2a. Monter avec les trous de montage

Maintenir le boîtier en place de manière à ce qu'il touche le bas de la solive. Le visser à la solive à travers les trous A et B.



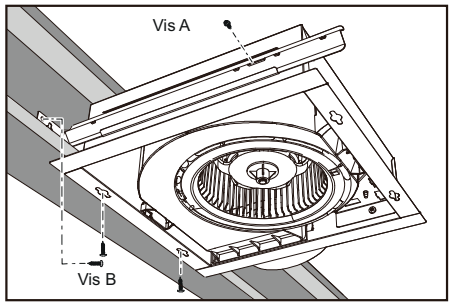
2b. Monter avec la barre de suspension

Glisser la barre de suspension dans l'étrier sur le boîtier et l'ajuster entre les solives. Maintenir le boîtier en place de manière à ce qu'il touche le bas de la solive. Le visser à la solive à travers les trous A et B. Visser la barre de suspension de l'autre côté de la solive par son trou.
Visser la barre de suspension au boîtier avec la vis A.



2c. Monter à la solive en I

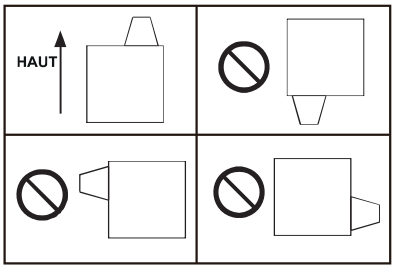
Glisser la barre de suspension dans l'étrier sur le boîtier et l'ajuster à la solive en I. Maintenir le boîtier en place de manière à ce qu'il touche le bas de la solive. Le visser à la solive à travers les trous A et B. Visser la barre de suspension de l'autre côté de la solive par son trou.
Visser la barre de suspension au boîtier avec la vis A.



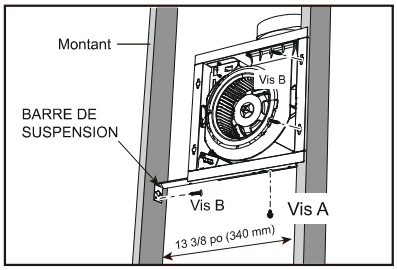
INSTRUCTIONS D'ASSEMBLAGE

3. Installation murale

3a. Lorsque l'appareil est installé sur le mur, l'adaptateur doit être orienté vers le haut.



3b. Glisser la barre de suspension dans l'étrier sur le boîtier. Maintenir le boîtier en place de manière à ce qu'il touche le bas du montant. Le visser au montant à travers les trous A et B du même côté. Visser la barre de suspension sur le montant à travers son trou. Visser la barre de suspension au boîtier avec la vis A. La distance minimale entre les montants est de 13 3/8 po (340 mm).

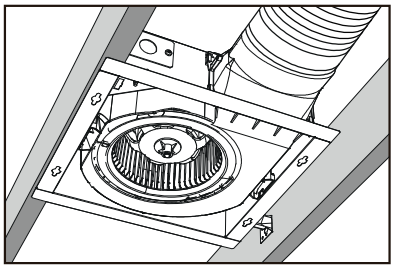


4. Installation du conduit rond

Raccorder le conduit rond flexible de 4 po (non inclus) au clapet/raccord de conduit et achemnier le conduit vers un capuchon de mur ou de toit (non inclus).

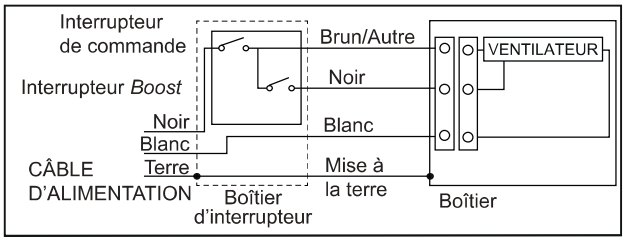
À l'aide de ruban adhésif métallique (non inclus), sceller tous les joints du conduit de façon à ce qu'ils soient étanches à l'air.

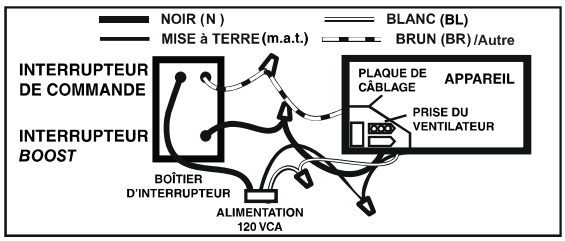
Le conduit de ce ventilateur vers l'extérieur du bâtiment a un effet important sur le débit de l'air, le bruit et l'utilisation d'énergie du ventilateur. Utiliser le chemin l eplus court et le plus droit possible pour un emeilleure performance et éviter d'installer le ventilateur avec des conduits plus petits que ceux recommandés. L'isolation autour des conduits peut réduire la perte d'énergie et inhiber la croissance des moisissures. Les ventilateurs installés avec des conduits exitants peuvent ne pas atteindre leur débit d'air nominal.



RACCORDEMENT ÉLECTRIQUE

Acheminer un câble résidentiel de 120 VCA jusqu'à l'emplacement du ventilateur. Utiliser seulement des capuchons de connexion homologués UL et un bague anti-traction pour câble homologué UL (non incluse) pour raccorder le câble résidentiel à la plaque de câblage. Consulter le schéma de câblage pour raccorder les fils comme il est illustré.





FONCTIONNEMENT

Voir « Raccordement Électrique » pour les détails.

Le boîtier de commande, situé à l'intérieur du boîtier du ventilateur, a trois réglages distincts :

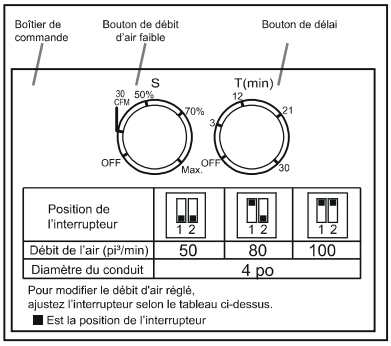
(1) le bouton de débit d'air faible ajuste le débit d'air inférieur de 30 pi³/min jusqu'au débit d'air de la vitesse élevée du ventilateur déterminée par le réglage de l'interrupteur à bascule.

Le ventilateur ne fonctionne pas lorsque le bouton est tourné entre OFF-30CFM (Réglage de l'usine à *off*)

(2) le bouton de délai est réglable de 3 à 30 minutes et ramènera le ventilateur au réglage de basse vitesse une fois que le commutateur *Boost* est désactivé pendant la période de temps défini.

Le réglage de la temporisation est désactivé lorsqu'il est réglé entre OFF-3 minutes (réglé en usine sur *OFF*).

(3) L'interrupteur à bascule ajustera le réglage de la vitesse supétieure du ventilateur de 50 à 100 pi³/min (Réglage de l'usine à 100 pi³/min).



Pour activer le ventilateur

Allumer le commutateur de commande (selon la section « Raccordement Électrique »).

• Le ventilateur fonctionnera à sa haute vitesse nominale si le commutateur *Boost* est activé.

• Le ventilateur fonctionnera en basse vitesse nominale en continu si le commutateur *Boost* est désactivé.

Pour utiliser la temporisation pour le changement du débit nominal du ventilateur

1. Allumer le commutateur de commande.
2. Allumer le commutateur *Boost*, le ventilateur fonctionnera en haute vitesse à son débit nominal.
3. Lorsque le commutateur *Boost* est éteint, le ventilateur continue de fonctionner en haute vitesse à son débit nominal jusqu'à ce que le temps alloué soit écoulé (le délai est réglable par l'utilisateur de 3 à 30 minutes), puis tournera automatiquement en basse vitesse nominale.

Pour désactiver le ventilateur

Éteindre le commutateur de commande.

Balayer le code QR pour le guide de démarrage rapide.

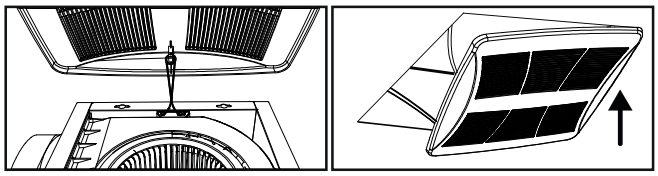
LIRE ET CONSERVER CES INSTRUCTIONS

Installateur : Laisser ce manuel au propriétaire.

INSTALLATION DE LA GRILLE

Installer le matériau de plafond pour terminer la construction du plafond. Puis, effectuer la découpe du matériau autour du boîtier.

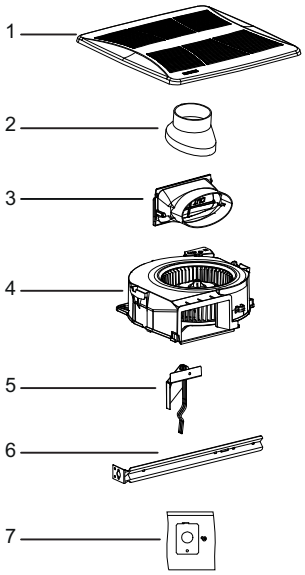
Pour fixer la grille au boîtier du ventilateur, pincer les ressorts se trouvant sur les côtés de la grille, puis installer la grille dans le boîtier en insérant les ressorts dans leurs fentes respectives. Poussez la grille vers le plafond pour la fixer fermement.



PIÈCES DE REMPLACEMENT

Nº	Pièce Nº	Nom	Description
1	S1110513	Ensemble de grille	Grille et ressorts
2	S1110515	Réducteur de conduit	De 4 po oval à 3 po
3	S1110516	Raccord de conduit	Plastique
4	S1110521	Ensemble ventilateur	Plaque moteur, moteur, roue, volute du ventilateur et contrôleur
5	S1110517	Ensemble de panneau de câblage/faisceau de fils	Incluant les fils
6	S1110519	Barre de suspension	1 pièce
7	S1110520	Sac de pièce	1 vis et 1 plaque de câblage

AVERTISSEMENT : Avant de remplacer une pièce, s'assurer de couper l'alimentation électrique.



GARANTIE

Cette garantie couvre tous les défauts de fabrication ou de matériaux pour :
Les pièces mécaniques et électriques contenues dans ce produit pour une période de 12 mois à compter de la date d'achat. Vous devez conserver et être en mesure de fournir votre facture originale comme preuve de la date d'achat. Cette garantie est couverte à l'acheteur au détail original de ce produit uniquement. Le fabricant remplacera toute pièce mécanique ou électrique qui se révèle défectueux dans un usage domestique normal pour une période de 12 mois.
CETTE GARANTIE NE COUVRE PAS :
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• Les dommages causés par l'expédition.
• Les dommages causés par un usage abusif, accident, modification, manque de soins appropriés et l'entretien.
• Les dommages causés par un service par des personnes autres qu'un électricien agréé.
• Ne couvre pas les frais de main-d'œuvre ou de transport liés à la réparation de ce produit.
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