

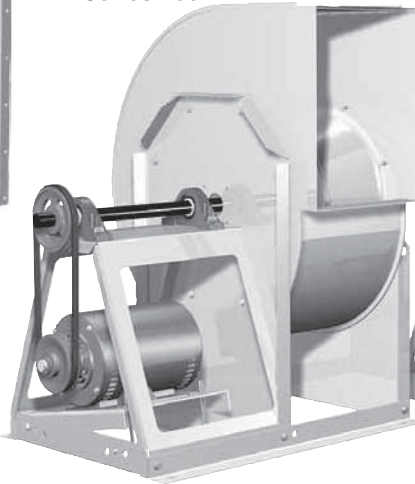
## Installation, Operation and Maintenance Manual

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 instructions could result in personal injury and/or property damage!

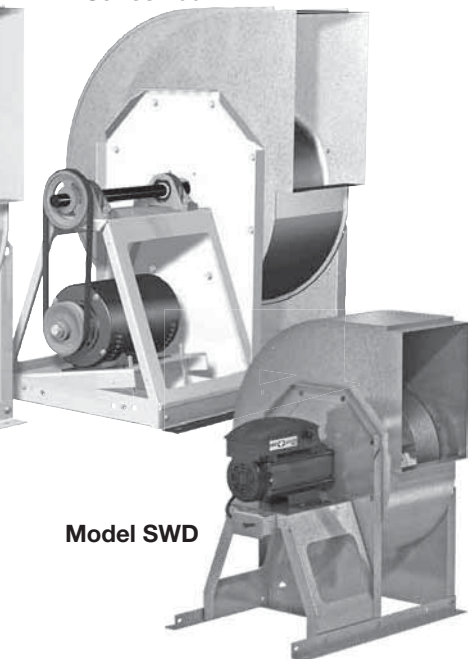
**Model SWB  
Series 300**



**Model SWB  
Series 200**

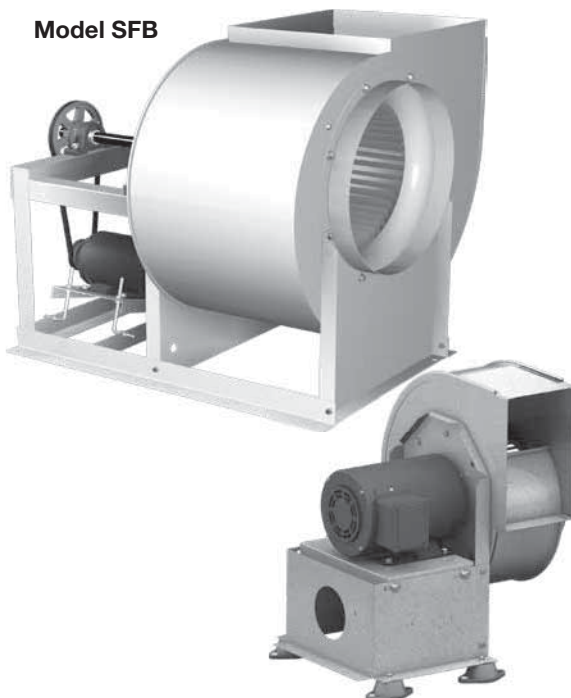


**Model SWB  
Series 100**



**Model SWD**

**Model SFB**



**Model SFD**

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## 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 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 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. 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 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 Greenheck Representative. Any physical damage to the unit after acceptance is not the responsibility of Greenheck Fan Corporation.

## 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.

## 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 remove any moisture build up. Leave coverings loose to permit air circulation and to allow for periodic inspection.

The unit should be stored at least 3½ 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 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 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 and bearings. If paint deterioration begins, consideration should be given to touch-up or repainting. Fans with special coatings may require special techniques for touch-up or repair.

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

## Removing From Storage

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

## Installation

Inspect the unit for any damage and report it to the shipper immediately. Also, check to see that all accessory items are accounted for.

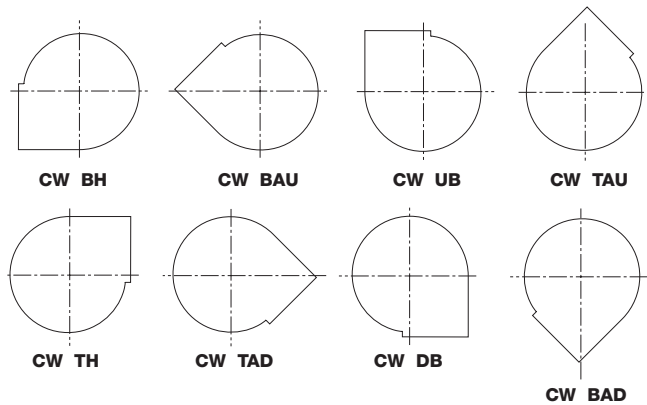
Move the fan to the desired location and fasten securely through mounting holes provided in the base angles. The unit must be set level (shimming may be necessary). Flexible duct connections and vibration isolators should be used where noise is a factor.

The motor voltage and ampere rating must be checked for compatibility with the electrical supply prior to final electrical connection. Supply wiring to the fan must be properly fused, and conform to local and national electrical codes.

The discharge is factory set as specified by customer order, however, it can be rotated to other discharge positions in the field if necessary. Removal of the housing bolts allows the discharge to be rotated to the clockwise positions below. For TAD, BD and BAD discharge positions, a portion of the frame angle must be removed.

Clockwise rotation shown. Counterclockwise discharge positions are a mirror image of those shown. Fan rotation is always specified from the drive side of the housing.

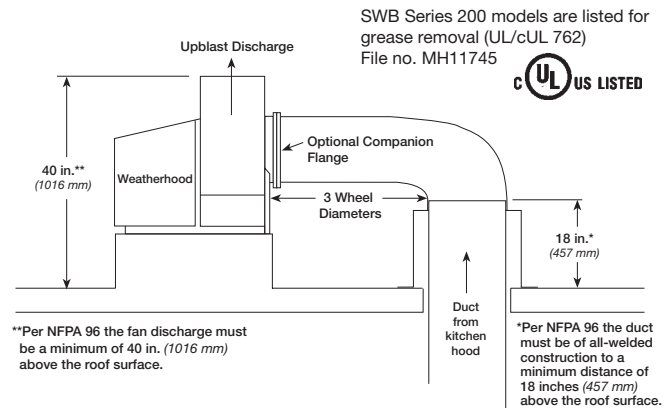
### Discharge Positions



## Installation of UL/cUL 762 Listed Fans for Restaurant Exhaust

The UL/cUL 762 listing for restaurant exhaust is available on model SWB Series 200, sizes 206 - 224, with a weatherhood.

UL/cUL 762 fans are listed for a maximum operating temperature of 375°F (191°C) and includes an access door and 1 inch (25.4 mm) drain connection. An outlet guard is strongly recommended when the fan discharge is accessible. An upblast discharge is recommended. The fan discharge must be a minimum of 40 inches (1016 mm) above the roof line and the exhaust duct must be fully welded to a distance of 18 inches (457 mm) above the roof surface.

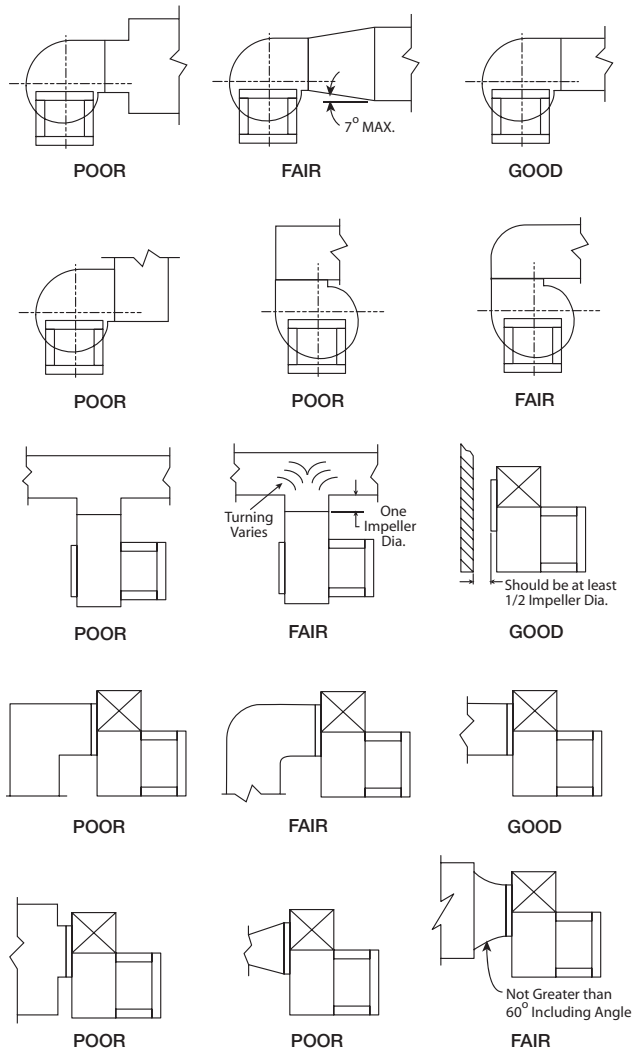


*This drawing is for dimensional information only. See the latest edition of NFPA 96 Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations for detailed installation instructions, materials, duct connections and clearances.*

## Effect of Installation on Performance

Restricted or unstable flow at the fan inlet can cause pre-rotation of incoming air or uneven loading of the fan wheel, yielding large system losses, increased sound levels and structural failure of the fan wheel. Free discharge or turbulent flow in the discharge ductwork will also result in system effect losses.

These examples show the system layout and inlet and discharge configurations which can affect fan performance.



## Pre-Starting Checks

### 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

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### 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.

## Alignment of Pulleys and Belts

Check pulleys and belts for proper alignment to avoid unnecessary belt wear, noise, vibration and power loss. Motor and drive shafts must be parallel and pulleys in line as shown in Figure 1.

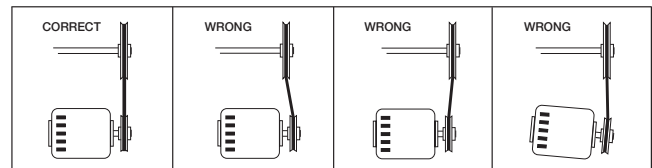


Figure 1

The adjustable motor pulley is set at the factory for the fan RPM specified by the customer. Fan RPM can be increased by closing or decreased by opening the adjustable motor pulley. Multigroove variable pitch pulleys must be adjusted an equal number of turns open or closed. Any increase in fan speed represents a substantial increase in load on the motor.

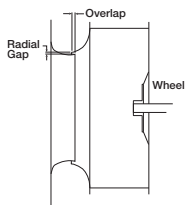
To avoid motor overheating and possible burnout, motor load amperes should always be checked and compared to nameplate rating when fan speed is increased.



## Wheels

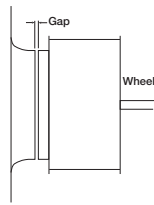
Wheels must rotate freely and not rub on the inlet venturi. Model SWB and SWD wheels overlap the inlet venturi as shown in Figure 2. Refer to the Approximate Wheel Clearance Dimensions table for the proper dimensions for wheel overlap and radial gap.

Models SFD and SFB wheels do not overlap the venturi, but have a gap between the inlet venturi and the wheel, see Figure 3. Wheel position is preset at the factory and the unit is test run. Wheel movement may occur during shipment or installation and wheel alignment may be necessary.



**Figure 2**

Model SWB / SWD



**Figure 3**

Model SFD / SFB

## Approximate Wheel Clearance Dimensions

Unit Size					SWB and SWD			SFD	SFB
SFD	SFB	SWD	SWB Series 100	SWB Series 200	Overlap	Overlap Tolerance	Radial Gap	Gap	Gap
inches (mm)									
6			106	206	—	—	—	3/8 (10)	—
7.5		7	107	207	—	—	—	3/8 (10)	—
9	9	8	108	208	—	—	—	1/2 (13)	1/2 (13)
10	10	10	110	210	3/8 (10)	1/4 (6)	5/32 (4)	1/2 (13)	1/2 (13)
	12			212	3/8 (10)	1/4 (6)	5/32 (4)	—	1/2 (13)
		13	113	213	7/16 (11)	1/4 (6)	5/32 (4)	—	1/2 (13)
	15	15	115	215	1/2 (13)	1/4 (6)	5/32 (4)	—	1/2 (13)
		16	116	216	1/2 (13)	1/4 (6)	5/32 (4)	—	—
	18	18	118	218	5/8 (16)	3/8 (10)	5/32 (4)	—	1/2 (13)
	20		120	220	5/8 (16)	3/8 (10)	5/32 (4)	—	5/8 (16)
	22			222	11/16 (18)	3/8 (10)	5/32 (4)	—	5/8 (16)
			124	224	3/4 (19)	3/8 (10)	5/32 (4)	—	—
	25				—	—	—	—	3/4 (19)
	27				7/8 (22)	1/4 (6)	3/16 (5)	—	3/4 (19)
	30				15/16 (24)	3/8 (10)	3/16 (5)	—	3/4 (19)

## Method for Centering Wheel

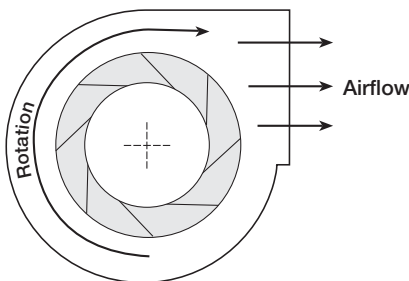
On belt drive units, centering can be accomplished by (a) loosening the inlet cone bolts to move the inlet cone or by (b) loosening the bearings in order to move the shaft. Wheel and inlet cone overlap can be adjusted by loosening the wheel hub set screws and moving the wheel to the desired position. For wheel hubs and shaft pulleys utilizing a tapered bushing interface, reference page 8 for the tapered bushing removal and move the wheel to the desired position. Tighten all fasteners and set screws securely and realign drive pulleys after adjustment.

## Wheel Rotation

Rotation direction of the wheel is critical and incorrect rotation will result in reduced air performance, increased motor loading and possible motor burnout.

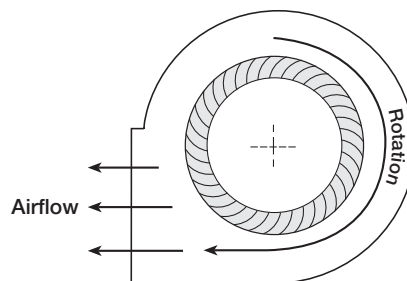
Check wheel rotation by momentarily energizing the unit and noting if rotation is in the same direction as the airflow at the outlet and conforms to the rotation decal affixed to the unit.

Wheels as viewed from the drive side:



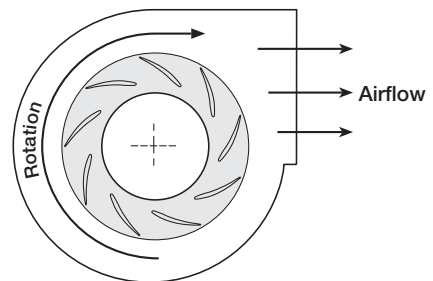
**Backward Inclined**

SWD and SWB Series 100 & 200



**Forward Curved**

SFD and SFB



**Airfoil**

SWB

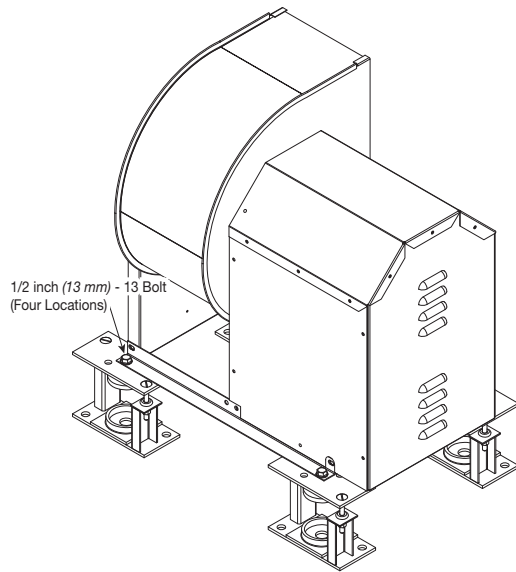
## NOTE

Models SFD and SFB units should be operated only when attached to the system for which they were designed. Without proper system static pressure, the motor could be overloaded.

# Mounting for Severe Duty Installation

## Isolator Anchoring

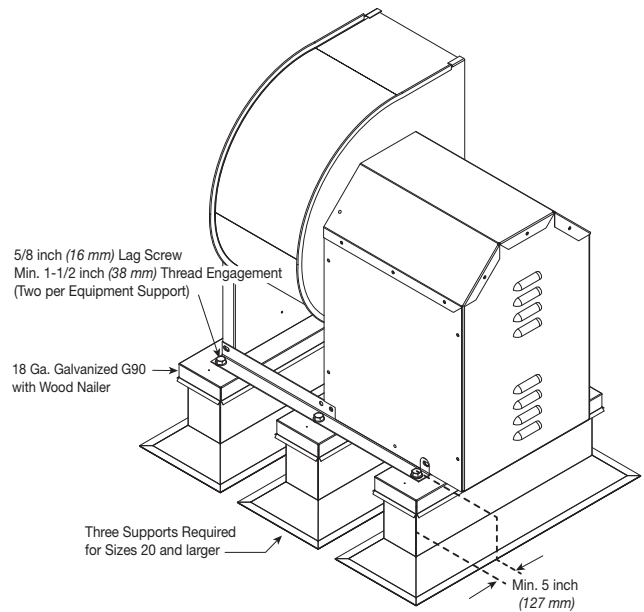
One fastener per isolator anchoring.  
Four isolators required.



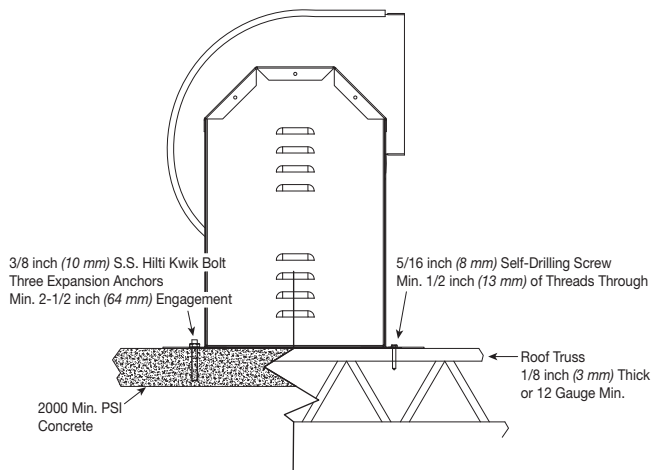
**Isolator Anchoring**

## Equipment Support Anchoring

Two fasteners per equipment support.  
Three supports required for model sizes 20 and larger.

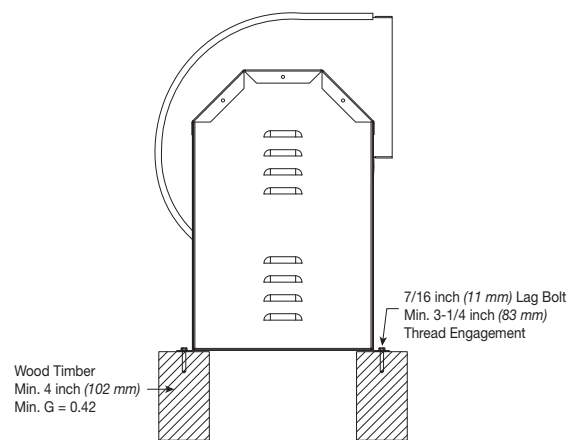


**Equipment Support Anchoring**



**Concrete Deck Anchoring**

**Steel Deck Anchoring**



**Timber Anchoring**

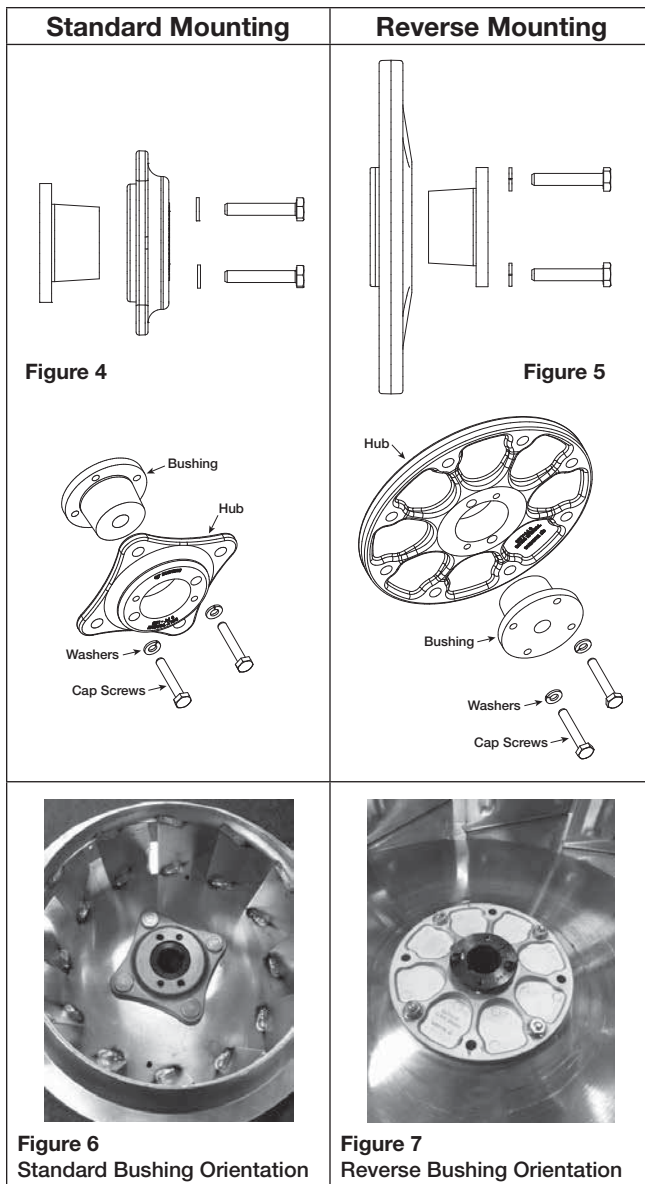
# Maintenance

## 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 4-7.



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.

### 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 fans 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.



## Bearing Lubrication Schedule

Shaft bearings are the most critical moving part of a fan. Therefore, special attention should be given to keeping the bearings clean and well lubricated. Proper lubrication provides for reduction in friction and wear, transmission and dissipation of heat, extended bearing life and prevention of rust.

In order for a lubricant to fulfill these tasks, the proper grease applied at regular intervals is required. See the recommended bearing lubrication schedule below.

If unusual conditions exist (temperatures below 32°F or above 200°F), moisture or contaminants - more frequent lubrication is required.

Recommended Bearing Lubrication Schedule					
Relubrication Schedule in Months					
Standard Grease					
Fan RPM	Bearing Bore (inches)				
	1/2 - 1	1 1/8 - 1 1/2	1 5/8 - 1 7/8	1 15/16 - 2 3/16	2 7/16 - 3
To 250	12	12	12	12	12
500	12	12	11	10	8
750	12	9	8	7	6
1000	12	7	6	5	4
1250	12	6	5	4	3
1500	12	5	4	3	2
2000	12	3	3	2	1
2500	12	2	2	1	0.5
3000	12	2	1	0.5	0.25
3500	12	1	0.5	0.25	-
4000	12	0.5	0.25	-	-
5000	12	0.25	-	-	-
Number of Shots	4	8	8	10	16

- Lubrication interval is based on 12 hour per day operation and maximum 160°F housing temperature. For 24 hour per day operation, the interval should be cut in half.
- Lubricant should be added with the shaft rotating and until clean grease is seen purging from the bearing. The lubrication interval may be modified based on the condition of the purged grease. If bearing is not visible to observe purged grease, lubricate with number of shots indicated in chart for bore size.
- For conditions including high temperatures, moisture, dirt or excessive vibration, consult the factory for a specific lubrication interval for your application.
- Lubricant should be a high quality lithium complex grease conforming to NLGI Grade 2. Factory recommends Mobilux EP-2.
- The use of synthetic lubricants will increase lubrication intervals by approximately 3 times.

In addition to lubricating the bearings at specified intervals, set screws in the bearing collars should be checked for tightness. A bearing collar which has loosened will cause premature failure of the fan shaft. Fasteners attaching the bearings to the drive frame should also be checked.

## Motor Maintenance (Belt and Direct Drive)

Motor maintenance is generally limited to cleaning and lubrication (where applicable). Cleaning should be limited to exterior surfaces only. Removing dust and grease buildup on the motor housing assures proper motor cooling. Use caution and do not allow water or solvents to enter the motor or bearings. Under no circumstances should motors or bearings be sprayed with steam, water or solvents.

Many fractional horsepower motors are permanently lubricated for life and require no further lubrication. Motors supplied with grease fittings should be greased in accordance with the manufacturer's recommendations.

## Wheel and Fastener Maintenance

Wheels require very little attention when exhausting clean air, however, air heavily laden with grease or dirt will tend to accumulate on the wheel causing unbalance. Wheels exhausting dirty or grease-laden air require frequent cleaning to assure smooth and safe operation.

All fasteners, including set screws in the bearing collars, should be checked for tightness each time maintenance checks are performed.

A proper maintenance program will help preserve the performance and reliability designed into the fan.

## Belt Maintenance (Belt Drive)

Belts tend to stretch after a period of time. They should be periodically checked for tension and wear. When replacing belts, use the same type as supplied with the unit. Replacement of belts should be accomplished by loosening the tensioning "L-Bolts" so the belts may be removed by hand. Do not force belts on or off as this may cause breakage of cords and lead to premature belt failure.

Belt tension should be adjusted to allow 1/64 in. of belt deflection per 1 in. of belt span. For example, a 16 in. belt span should have 16/64 in. or 1/4 in. of deflection with moderate thumb pressure at mid-point between the pulleys. (Figure 8).

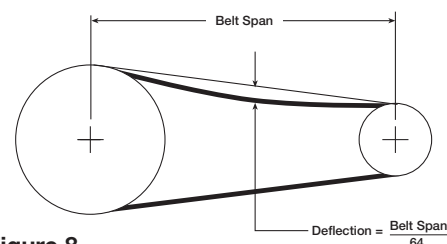
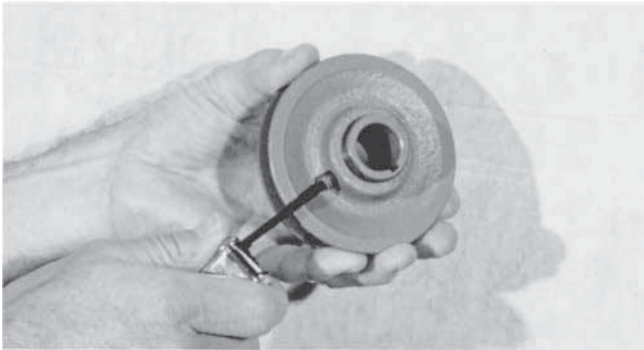


Figure 8

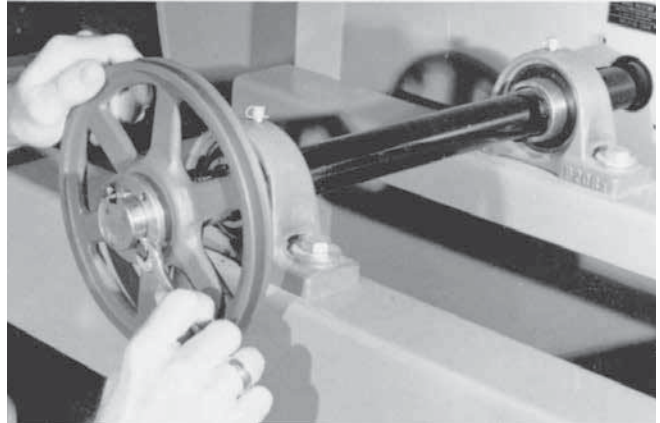
Refer to Greenheck's Product Application Guide, "Measuring Belt Tension" for additional information—FA/127-11, found online at [www.greenheck.com](http://www.greenheck.com) under the library section.

## Motor and Drive Installation Instructions

For model SWB and SFB units that are shipped from stock without motors or drives.



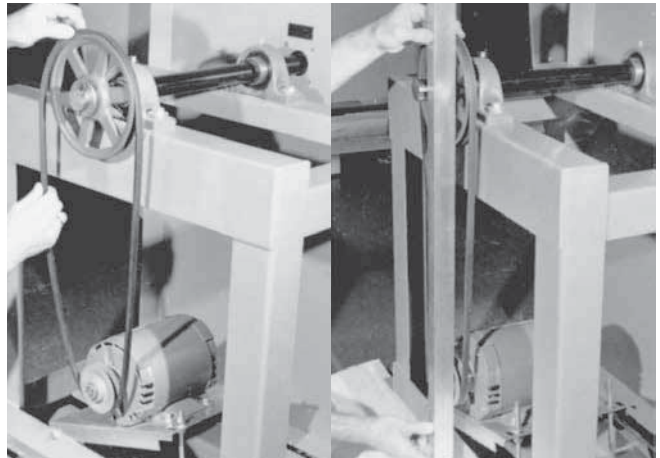
1. Adjust motor pulley to its closed position for maximum fan speed or increments of 1/2 turn open (maximum of 5 turns open) for reduced fan speed. Tighten set screw on flat area only.



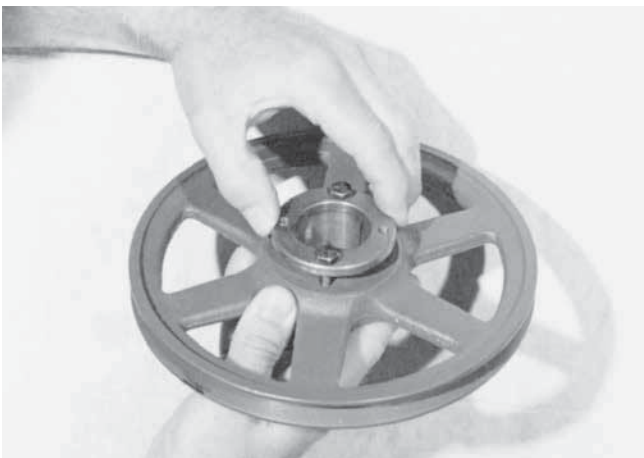
4. Install shaft pulley to fan shaft.



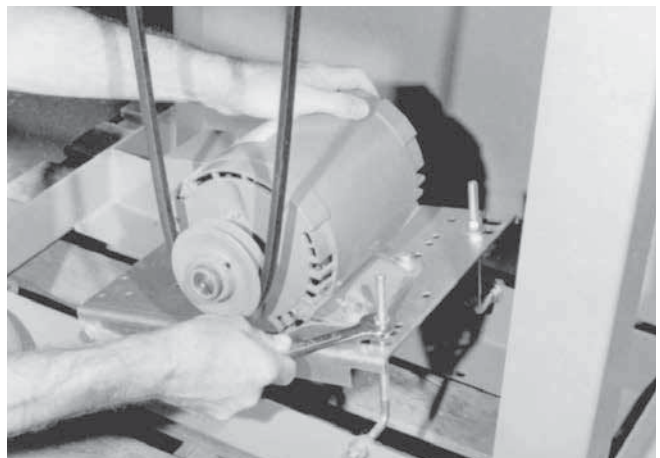
2. Install motor pulley to the motor shaft and install motor to the motor plate. Pre-punched holes are provided for most common motor frame sizes.



5. Install drive belt(s). Belts should not be forced over pulleys. Align motor and shaft pulleys. Tighten all set screws.



3. If supplied, install taperlock bushing into shaft pulley.



6. Adjust belt tension.  
See page 9 for belt tensioning instructions.

## Parts List

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

### CAUTION

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

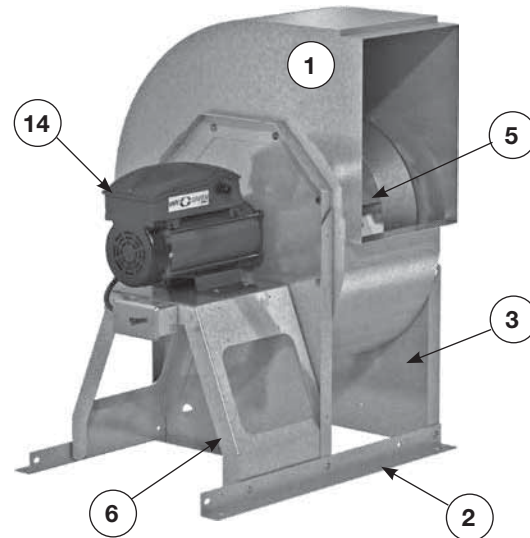
### CAUTION

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

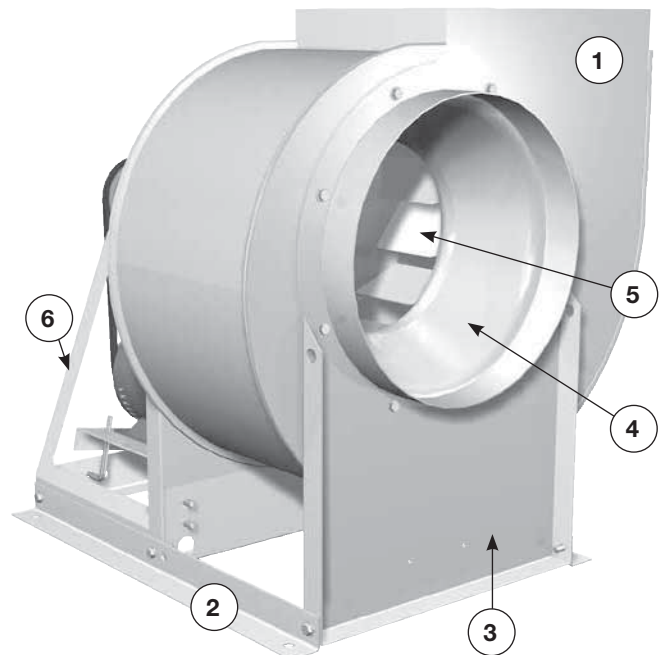
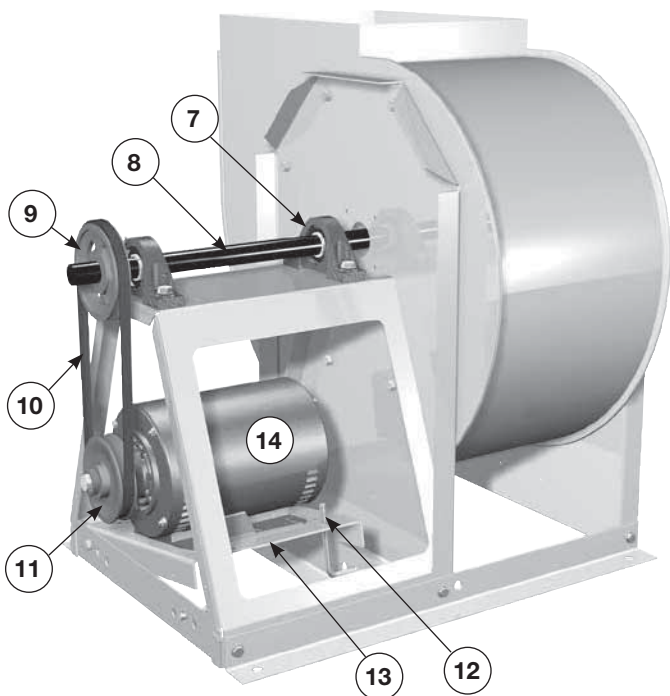
### Available Replacement Parts:

1. Scroll housing
2. Drive frame - base angle
3. Intake support panel
4. Inlet ring and cone
5. Wheel (specify rotation)
6. Drive frame assembly
7. Pillow block bearings
8. Fan shaft
9. Shaft pulley
10. Belt
11. Motor pulley
12. Belt tensioning bolts
13. Motor plate
14. Motor

### Direct Drive



### Belt Drive



## 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	Wheel Rubbing Inlet	Adjust wheel and/or inlet cone. Tighten wheel hub or bearing collars on shaft.
	V-Belt Drive	Tighten sheaves on motor/fan shaft. Adjust belt tension. Align sheaves properly (see page 5). Replace worn belts or sheaves.
	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.
Low CFM	Fan	Check wheel for correct rotation. Increase fan speed.*
	Duct System	See page 5.
High CFM	Fan	Resize ductwork. Access door, filters, grills not installed.
	Duct System	Change obstructions in system. Use correction factor to adjust for temperature/altitude. Resize ductwork. Clean filters/coils. Change fan speed.*
Static Pressure Wrong	Duct system has more or less restriction than anticipated	Check rotation of wheel. Adjust fan speed.
High Horsepower	Fan	Check rotation of wheel. Reduce fan speed.
	Duct System	Resize ductwork. Check proper operation of face and bypass dampers. Check filters and access doors.
Fan Doesn't Operate	Electrical Supply	Check fuses. Check for circuit breakers in the off position. Check for correct supply voltage.
	Drive	Check for broken belts. Tighten loose pulleys.
	Motor	Assure motor is correct horsepower and not tripping overload protector.
Overheated Bearing	Lubrication	Check for excessive or insufficient grease in the bearing.
	Mechanical	Replace damaged bearing. Relieve excessive belt tension. Align bearings. Check for bent shaft.

\*Always check motor amps and compare to nameplate rating. Excessive fan speed may overload the motor and result in burnout.

## Our Commitment

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

Specific Greenheck product warranties are located on [greenheck.com](http://greenheck.com) within the product area tabs and in the Library under Warranties.

Greenheck's Centrifugal Utility Fans 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](http://www.amca.org).

