

Installation, Operation and Maintenance Manual

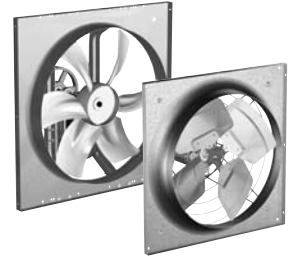
Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate, or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or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

Sidewall Propeller Fans

Greenheck's sidewall propeller fan line is the ideal choice for factory and warehouse applications where high volumes of air and low pressures are required. From general ventilation to industrial duty, the range of construction and performance capabilities offered represent the most comprehensive sidewall propeller fan line in the industry.

Performance spans the range between 300 to 87,000 cfm (510 to 147,814 m³/hr) with static pressures to 1.25 in. wg (249 Pa). Fan sizes range from 8 to 54 inches (203 to 1372 mm) for direct drive and 20 to 72 inches (508 to 1829 mm) for belt drive. Regardless of fan size, performance or duty level, all Greenheck sidewall propeller fans are built to perform with the same high standards of reliability and durability. All models are available in exhaust or supply arrangements.

Models SE1, SS1, SE2, SS2, SCE3, SCS3, SCR3, SBE-1, SBS-1, SBE-2, SBS-2, SBE-3, SBS-3, SBCE, SBCE, and SBCR.



Filtered Supply

Filtered supply wall housings are available in seven sizes for fans ranging from size 24 to 54 inches (610 to 1372 mm). They are designed with the draw-thru concept to achieve the highest filter and fan efficiencies. Permanent 2 inch (51 mm) washable filters are accessed through a bolted panel and can be easily removed for cleaning.



General Safety Information

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

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.

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

Receiving

Upon receiving the product, check to make sure all items are accounted for by referencing the bill of lading to ensure all items were received. Inspect each crate for shipping damage before accepting delivery. Notify the carrier if any damage is noticed. The carrier will make notification on the delivery receipt acknowledging any damage to the product. All damage should be noted on all the copies of the bill of lading which is countersigned by the delivering carrier. A Carrier Inspection Report should be filled out by the carrier upon arrival and reported to the Traffic Department. If damaged upon arrival, file a claim with carrier. 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.

Note: The filtered supply unit ships with all ordered components completely factory assembled. The optional weatherhood ships knocked down for field assembly and installation.

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 on 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.

Pre-Installation Checks

- Check chart below for correct wall opening dimensions.
- Check motor voltage and amperage rating for compatibility with electrical supply. Supply wiring must be properly fused and conform to local and national codes.
- Motor load amperage must be checked and compared to nameplate rating to avoid serious damage to motor when speed is increased.

Wall Opening Requirements

Wall opening size and propeller-to-damper distance are two important dimensions for fan installation.

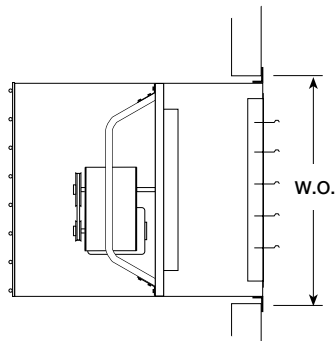


Figure 1 - Wall Housing Installation

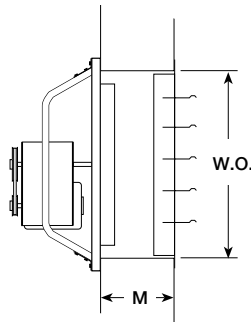


Figure 3 - Direct to Wall Installation

Fans mounted to the wall require a different wall opening (W.O.) size than those mounted in collars or wall housings. Propeller-to-damper distance (M) is important to reduce turbulence and damper flutter which may lead to premature damper failure.

Figure 1 and 2 show the wall opening (W.O.) required for installations with either a wall housing or collar.

Figure 3 shows the recommended wall opening (W.O.) and the minimum distance (M) suggested between the fan and damper for direct to wall installations.

Figure 4 shows the dimensions and wall opening (W.O.) required for installations with a filtered supply wall housing.

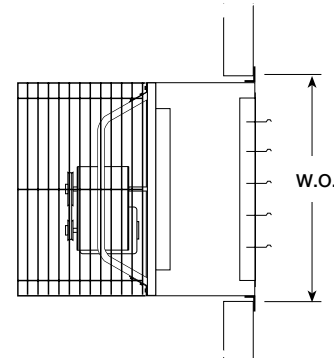


Figure 2 - Wall Collar Installation

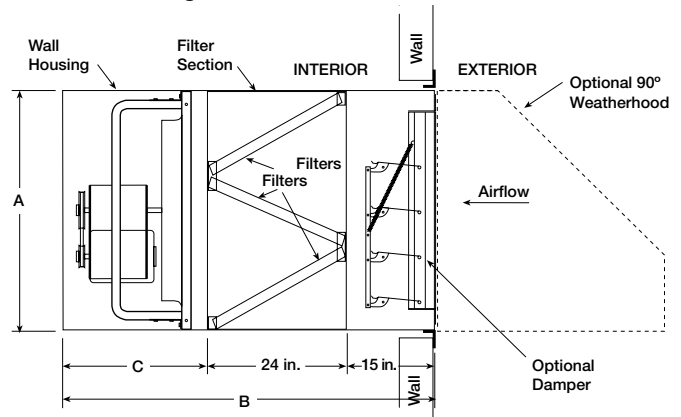


Figure 4 - Filtered Supply Wall Housing Installation

Fan Size	Damper Size Square	Recommended Wall Opening (W.O.) Square			M Minimum	Filtered Supply Wall Housing Only				
		Figures 1 and 2	Figure 3	Figure 4		A	B	C	Filter Quantity & Size	
8	10 (254)	14¼ (362)	10½ (267)	-	6 (152)	-	-	-	-	-
10	12 (305)	16¼ (413)	12½ (318)	-	6 (152)	-	-	-	-	-
12	14 (356)	19¼ (489)	14½ (368)	-	7 (178)	-	-	-	-	-
14	16 (406)	21¼ (540)	16½ (419)	-	8 (203)	-	-	-	-	-
16	18 (457)	23¼ (591)	18½ (470)	-	9 (229)	-	-	-	-	-
18	20 (508)	25¼ (641)	20½ (521)	-	10 (254)	-	-	-	-	-
20	22 (559)	27¼ (692)	22½ (572)	-	12 (305)	-	-	-	-	-
24	26 (660)	33¼ (857)	26½ (673)	33¼ (857)	13 (330)	32¼ (819)	63 (1600)	24 (610)	4	23¼ x 16¼ (591 x 413)
30	32 (813)	39¼ (1010)	32½ (826)	39¼ (1010)	13 (330)	38¼ (972)	65 (1651)	26 (660)	4	24¾ x 19¼ (625 x 489)
36	38 (965)	45¼ (1162)	38½ (978)	45¼ (1162)	14 (356)	44¼ (1124)	67¼ (1708)	28¼ (718)	6	23¼ x 22½ (591 x 562)
42	44 (1118)	51¼ (1314)	44½ (1130)	51¼ (1314)	15 (381)	50½ (1273)	72⅞ (1851)	34 (864)	6	24½ x 25½ (613 x 638)
48	50 (1270)	57¼ (1467)	50½ (1283)	57¼ (1467)	16 (406)	56½ (1426)	72⅞ (1851)	34 (864)	12	23¼ x 18¾ (591 x 476)
54	56 (1422)	63¼ (1619)	56½ (1435)	63¼ (1619)	17 (432)	62⅞ (1584)	79⅞ (2024)	40⅞ (1033)	12	23¼ x 20¾ (591 x 527)
60	62 (1575)	69¼ (1772)	62½ (1588)	-	19 (483)	-	-	-	-	-
72	74 (1880)	84¼ (2153)	74½ (1892)	-	19 (483)	-	-	-	-	-

All dimensions given in inches (millimeters). Filters are 2 inch (51 mm) nominal thickness. Above filter sizes are actual dimensions.

WARNING

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

Typical Installation

Move fan to the desired location and determine the method by which the fan is to be mounted as shown in Figures 1-4 shown on page 3. Optional wall mount housings (Figure 1) and wall mount collars (Figure 2) provide a convenient means of mounting sidewall propeller fans while maintaining the proper distance between propeller and damper.

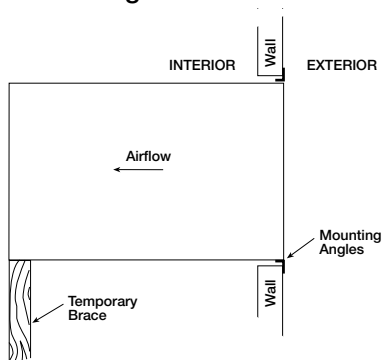
Attach the fan by inserting a suitable fastener through each of the prepunched mounting holes in the fan panel. Care should be taken not to bend or distort the fan panel or drive components during installation.

Support Braces

Wall Housing sizes 42 and larger with heavy motors and all Filtered Supply Wall Housings need additional bracing.

Filtered Supply Wall Housing Installation

Step 1 Install Housing

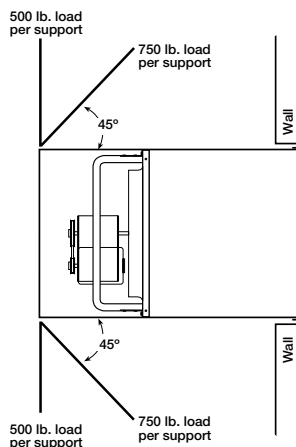


Install housing through wall opening from outside.

Temporarily brace end of unit until permanent support braces are installed.

Secure through prepunched holes in angles with suitable fasteners.

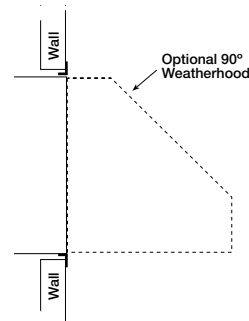
Step 2 Install Support Braces



Choose method of support. Attach support to end of unit (above or below housing) with rods, cable, angle, etc. (supplied by others) as shown.

Vertical braces must carry a minimum load of 500 pounds per support, and angled (45°) braces a minimum of 750 pounds per support based on two supports.

Step 3 Install Weatherhood

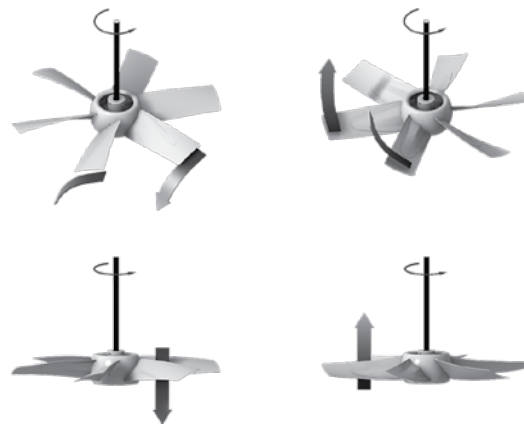


Position weatherhood over end of wall housing and fasten through mounting holes with self-tapping screws. Caulk, flash and complete electrical hook-up to finish installation.

Pre-Starting Checks

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

The propeller should rotate freely and not rub on the fan panel venturi. Rotation direction of the propeller should be checked by momentarily turning the unit on. Propeller blade should cup and throw the air when rotating in the correct rotation as shown in the figure below. Rotation should be in the same direction as the rotation decal affixed to the unit.



For 3-phase installations, fan rotation can be reversed by simply interchanging any two of the three electrical leads. For single-phase installations follow the wiring diagram located on the motor.

For Belt Drive Fans: The adjustable motor pulley is preset at the factory for the specified fan RPM. Fan speed can be increased by closing or decreased by opening the adjustable pulley. Two or three groove variable pitch pulleys must be adjusted an equal

number of turns open. Any increase in fan speed represents a substantial increase in horsepower required from the motor. Always check motor load amperage and compare to nameplate rating when changing fan speed.

Routine Maintenance

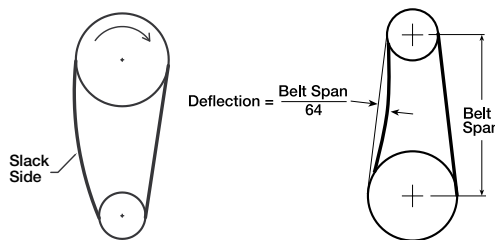
Once the fan has been put into operation, a periodic maintenance program should be set up to preserve the reliability and performance of the fan. Items to be included in this program are: Belts, Bearings, Fasteners and Setscrews, Lubrication, and Removal of Dust and Dirt.

WARNING

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

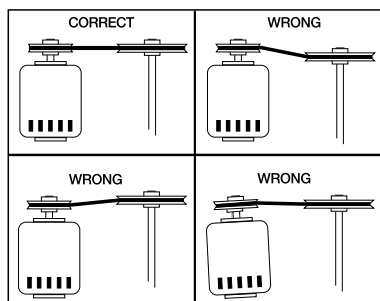
Belts

Premature belt failures are frequently caused by improper belt tension (either too tight or too loose) or misaligned pulleys. The proper tension for operating a V-belt is the lowest tension at which the belts will not slip at peak load conditions. For initial tensioning, the proper belt deflection halfway between pulley centers is 1/64 inch (0.4 mm) for each inch of belt span. For example, if the belt span is 64 inches (1626 mm), the belt deflection should be one inch (25 mm) using moderate thumb pressure at midpoint of the drive. See figure shown below.



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

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



Bearings (For belt drive fans only)

Bearings are the most critical moving part of the fan and should be inspected at periodic intervals. Locking collars and setscrews, in addition to fasteners attaching the bearings to the bearing plate, must be checked for tightness. In a clean environment and temperatures above 32°F (0°C) and below 200°F (93°C), fan shaft bearings with grease fittings should be lubricated semi-annually using a high-quality lithium based grease. If unusual environmental conditions exist, temperatures below 32°F (0°C) and above 200°F (93°C), moisture or contaminants, more frequent lubrication is required.

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

Fasteners and Setscrews

Any fan vibration has a tendency to loosen mechanical fasteners. A periodic inspection should include checking all fasteners and setscrews for tightness. Particular attention should be paid to setscrews or taper-lock bushings attaching the propeller to the motor shaft and the motor shaft to the bearings. Loose bearing setscrews will lead to premature failure of the fan shaft. In addition, check all fasteners attaching the motor to the motor plate.

Lubrication

Refer to the paragraph on bearings for bearing lubrication. Many fractional horsepower motors installed on the smaller fans are lubricated for life and require no further attention. Motors equipped with oil holes should be oiled in accordance with the manufacturer's instructions printed on the motor. Use a high grade SAE 20 machine oil and use caution not to over lubricate. Motors supplied with grease fittings should be greased according to directions printed on the motor.

Removal of Dust and Dirt

Dirt clogs cooling openings on the motor housing, contaminates bearing lubricant and collects on propeller blades causing severe imbalance if left unchecked. The exterior surface of the motor, fan panel and entire propeller should be thoroughly cleaned periodically. Use caution and do not allow water or solvents to enter the motor or bearings. Motors or bearings must not be sprayed with steam or water.

The filters also require periodic cleaning. The 2 inch (51 mm) washable aluminum filters are accessed through the bolted access panel.

Troubleshooting

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

PROBLEM	CAUSE	CORRECTIVE ACTION
Too Much Airflow	Resistance lower than designed	Decrease fan speed.
Reduced Airflow	System resistance too high	Check backdraft dampers for proper operation. Remove obstructions in ductwork. Clean dirty filters. Check for adequate supply air for exhaust fans or exhaust air for supply fans.
	Fan too close to damper	Increase distance between fan and damper.
	Fan speed too low	Increase fan speed.
	Excessive dirt buildup on propeller	Clean propeller.
Excessive Noise	Bearings	Tighten collars and fasteners. Lubricate bearings. Replace defective bearings.
	V-Belt drive	Tighten pulleys on motor and fan shaft. Adjust belt tension. Align pulleys properly. Replace worn belts or pulleys. See Maintenance.
	Excessive vibration	Clean dirt buildup from propeller. Check all setscrews and fasteners for tightness. Check for worn bearing. Correct propeller imbalance. Check for loose dampers, guards or ductwork.
	Defective motor	Replace motor.
	Variable Frequency Drive (VFD)	Check VFD for drive setting, some controllers are able to be adjust to lower the harmonic noises sometimes heard during operation by adjusting a simple setting on the controller.
	Debris	Remove all debris from the fan.
Fan Does Not Operate	Electrical Supply	Check fuses/circuit breakers. Check for switches turned off or disconnected. Check for correct supply voltage.
	Drive	Check for broken or worn belts. Tighten loose pulleys.
	Motor	Assure motor is correct horsepower and not tripping overload protector.

Maintenance Documentation

Job Information

Job Name: _____ Service Organization: _____
 Address: _____ Address: _____
 City: _____ City: _____
 State: _____ Zip: _____ State: _____ Zip: _____
 Phone: _____ Phone: _____
 Contact Person: _____ Work Done By: _____

Nameplate Information

Model: _____
 Volts: _____ Hertz: _____ Phase: _____
 Amps: _____ Mark: _____
 Supply hp: _____ Exhaust hp: _____
 Serial Number: _____
 Model Voltage: _____
 Motor Amperage: _____
 Fan RPM: _____

Field Start-Up Documentation

Actual Voltage: _____ Hertz: _____ Phase: _____
 Actual Amperage: _____
 Blower Rotation: _____
 Air Volume: Design cfm: _____
 Actual cfm: _____
 Level of fan (L or H): _____
 Fan RPM Range (min.) _____ (max.) _____

Parts List

NOTE

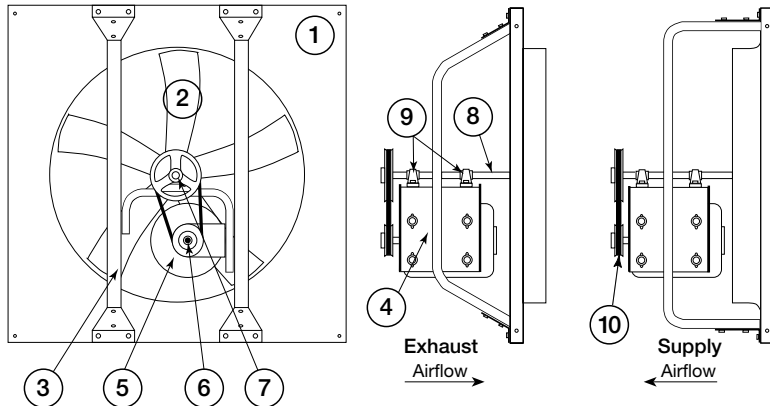
Each fan bears a manufacturer's nameplate with model number and serial number embossed. This information will assist the local Greenheck representative and the factory in providing service and replacement parts. Before taking any corrective action, make certain unit is not capable of operation during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

CAUTION

A fan manufactured with an explosion resistant motor does not certify the entire unit to be explosion proof.

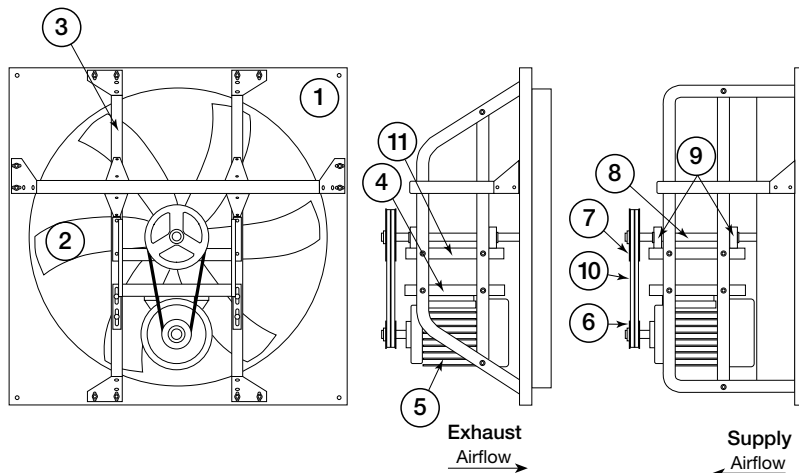
Parts List - Belt Drive

SBE-1, SBS-1, SBE-2 and SBS-2 (L and H propellers)



1. Fan Panel
2. Propeller
3. Drive Frame Channel (2)
4. Motor / Bearing Plate
5. Motor
6. Motor Pulley
7. Shaft Pulley
8. Fan Shaft
9. Bearings (2)
10. Belt

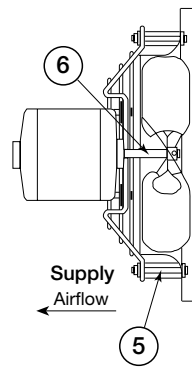
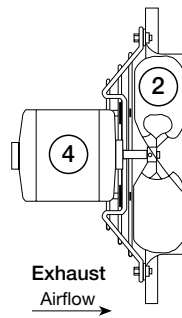
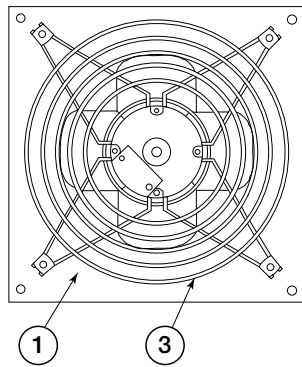
SBE-3, SBS-3, SBCE, SBCE, and SBCR (L and H propellers)



1. Fan Panel
2. Propeller
3. Drive Frame Channel (2)
4. Motor Plate
5. Motor
6. Motor Pulley
7. Shaft Pulley
8. Fan Shaft
9. Bearings (2)
10. Belt
11. Bearing Plate

Parts List - Direct Drive

SE1 and SS1 (Sizes 8 thru 12 - D, G and E motor speeds)

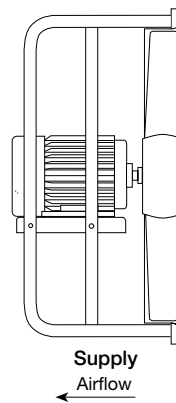
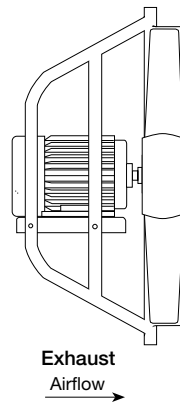
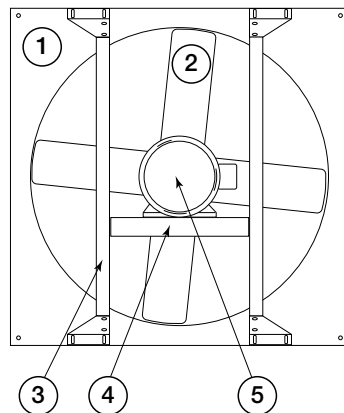


1. Fan Panel
2. Propeller
3. Drive Frame/Motor Support
4. Motor
5. Riser Blocks (4) - supply fan only
6. Shaft Extension- supply fan only

SE1 and SS1 (Sizes 12 thru 24 - A, B and C motor speeds)

SE2 and SS2

SCE3, SCS3 and SCR3



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

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

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

Greenheck Catalog Sidewall Propeller Fans 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.

