GREENHECK
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Document 453284
Model BCF
Centrifugal Cabinet Fans

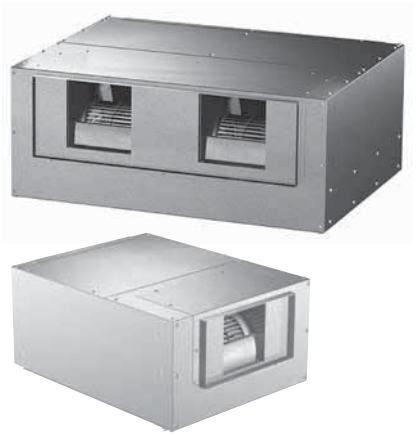
Installation, Operation and Maintenance Manual

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.

Belt Drive Low-Profile Cabinet Fan

This fan is designed for efficiency and reliability in supply, exhaust or ducted return applications. These cabinet fans are available in single and double fan models. In double fan models, each wheel is housed separately, but both are driven by a single motor and shaft. Fan wheels are statically and dynamically balanced to assure vibration free operation.

Every model has been designed with low-profile construction to fit within tight spaces, as low as 11 inches *(280 mm)*. Capacities range from 170 to 5,850 cfm *(290 to 9950 m^3/hr)* with static pressures up to 1½ in. wg *(375 Pa)*. Model BCF is AMCA Licensed for Air Performance.



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 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.

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.

Table of Contents

Receiving

Upon receiving the product, check to ensure all items are accounted for by referencing the delivery receipt or packing list. Inspect each crate or carton for shipping damage before accepting delivery. Alert the carrier of any damage detected. The customer will make notification of damage (or shortage of items) on the delivery receipt and all copies of the bill of lading which is countersigned by the delivering carrier. If damaged, immediately contact your 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.

Handling

Move fan to desired location and determine position of access panels and motor. Make sure inlet and outlet have at least 2½ times the wheel diameter (duct diameter) before any obstructions like an elbow or transition. Attach the fan to a suitable framework as specified, hanging or base vibration isolators are recommended. See Table 2 on page 4 for physical dimensions (Figures 2 and 3) and Table 1 on page 3 for mounting dimensions (Figure 1).

The motor's amperage and voltage ratings must be checked for compatibility to supply voltage prior to final electrical connection. Supply wiring may be routed through knockouts which are provided on the top and bottom of each fan housing. Provide adequate wiring to permit the access doors to open for servicing. Wiring should be secured inside the fan to prevent interference with the drive components. 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.

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 3½ in. *(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 & 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

Models are designed for horizontal applications only. To install the fan, refer to the mounting dimensions in Table 1 (Figure 1) on page 3 and unit dimensions in Table 2 (Figures 2 and 3) on page 4.

Duct Length

In order to achieve cataloged performance, the fan should be installed with approximately 2½ wheel diameters of straight duct on both the inlet and outlet of the fan.

Discharge Position

These fans can be ordered with either horizontal or vertical discharge. Fan performance is identical for either orientation.

Mounting Dimensions

Figure 1
Mounting Dimensions

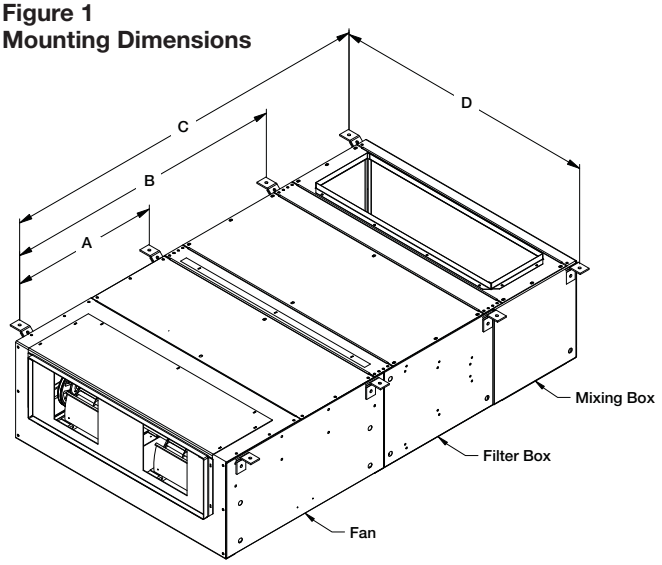


TABLE 1	Hanging or Base Mounts			
Fan Size	A	B	C	D
106	19½ *(493)*	42½ *(1080)*	52½ *(1334)*	24¼ *(616)*
107	25 *(635)*	47¾ *(1213)*	60¾ *(1543)*	27¼ *(692)*
108	29 *(737)*	52⅜ *(1330)*	69 *(1753)*	30¼ *(768)*
110	29½ *(749)*	56⅛ *(1426)*	75 *(1905)*	36¼ *(921)*
112	38 *(965)*	64⅞ *(1648)*	87¾ *(2229)*	40½ *(1029)*
206	19½ *(493)*	42½ *(1080)*	52½ *(1334)*	38¼ *(972)*
207	25 *(635)*	47¾ *(1213)*	60¾ *(1543)*	42¼ *(1073)*
208	29 *(737)*	52⅜ *(1330)*	69 *(1753)*	48¼ *(1226)*
210	29½ *(749)*	56⅛ *(1426)*	75 *(1905)*	52¼ *(1327)*
212	38 *(965)*	64⅞ *(1648)*	87¾ *(2229)*	62¼ *(1581)*

All dimensions are in inches *(millimeters)*.

NOTE: Only four (4) hanging or base mounts required for a fan without a mixing box and filter box.

NOTE: Fan can NOT be mounted vertically.

NOTE: Do not use in a corrosive environment.

Dimensional Data

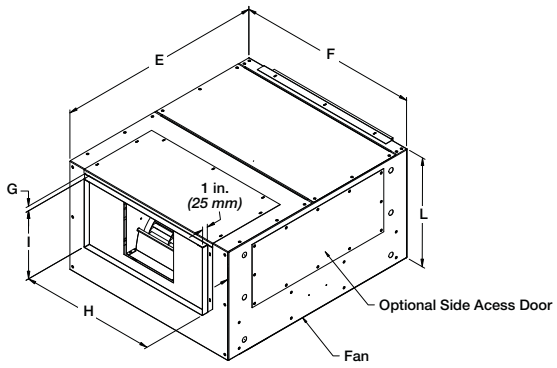


Figure 2
Unit Dimensions

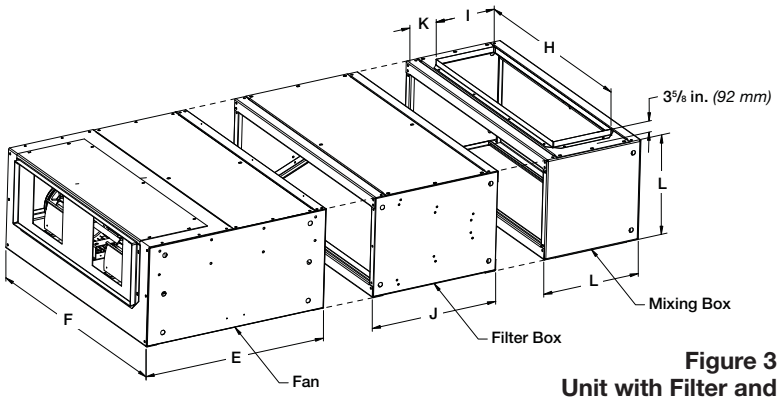


Figure 3
Unit with Filter and Mixing Box Dimensions

TABLE 2

Fan Size	E	F	G	H	I	J		Filter Size				K	L
						Slide-Out	Sloped	Slide-Out	Qty.	Sloped	Qty.		
106	23¼ *(591)*	20 *(508)*	-	12 *(305)*	6 *(152)*	6 *(152)*	22 *(559)*	19½ x 10¼ *(495 x 260)*	1	16 x 20 *(406 x 508)*	1	2½ *(64)*	11 *(279)*
107	29 *(737)*	23 *(584)*	5/8 *(16)*	15 *(381)*	8 *(203)*	6 *(152)*	23 *(584)*	22⅞ x 12¼ *(581 x 311)*	1	16 x 20 *(406 x 508)*	1	2½ *(64)*	13 *(330)*
108	32 *(813)*	26 *(660)*	5/8 *(16)*	18 *(457)*	10 *(254)*	6 *(152)*	24 *(610)*	25⅞ x 15½ *(657 x 394)*	1	16 x 20 *(406 x 508)*	2	3 *(76)*	16 *(406)*
110	36 *(914)*	32 *(813)*	5/8 *(16)*	24 *(610)*	12 *(305)*	7 *(178)*	25 *(635)*	31⅞ x 18½ *(810 x 470)*	1	20 x 20 *(508 x 508)*	2	3½ *(89)*	19 *(483)*
112	42 *(1067)*	36 *(914)*	5/8 *(16)*	28 *(711)*	14 *(356)*	7 *(178)*	27 *(686)*	35⅞ x 22⅜ *(911 x 568)*	1	16 x 20 *(406 x 508)*	4	4½ *(114)*	23 *(584)*
206	23¼ *(591)*	34 *(864)*	5/8 *(16)*	26 *(660)*	6 *(152)*	6 *(152)*	22 *(559)*	33⅞ x 10¼ *(860 x 260)*	1	20 x 20 *(508 x 508)*	1	2½ *(64)*	11 *(279)*
207	29 *(737)*	38 *(965)*	5/8 *(16)*	30 *(762)*	8 *(203)*	6 *(152)*	23 *(584)*	37⅞ x 12¼ *(962 x 311)*	1	16 x 20 *(406 x 508)*	2	2½ *(64)*	13 *(330)*
208	32 *(813)*	44 *(1118)*	5/8 *(16)*	36 *(914)*	10 *(254)*	6 *(152)*	24 *(610)*	43⅞ x 15½ *(1114 x 394)*	1	16 x 20 *(406 x 508)*	4	3 *(76)*	16 *(406)*
210	36 *(914)*	48 *(1219)*	5/8 *(16)*	40 *(1016)*	12 *(305)*	7 *(178)*	25 *(635)*	47⅞ x 18½ *(1216 x 470)*	1	20 x 20 *(508 x 508)*	4	3½ *(89)*	19 *(483)*
212	42 *(1067)*	58 *(1473)*	5/8 *(16)*	50 *(1270)*	14 *(356)*	7 *(178)*	27 *(686)*	57⅞ x 22½ *(1470 x 572)*	1	20 x 25 *(508 x 635)*	4	4½ *(114)*	23 *(584)*

All dimensions are in inches *(millimeters)*.

Weight Information

NOTE: Filter section has bolt-on access doors on both sides.

TABLE 3

Fan Size	*Unit	Filter Box		Mixing Box	
		Slide-Out	Sloped	Without Damper	With Damper
106	80 *(36)*	9 *(229)*	24 *(610)*	14 *(356)*	29 *(737)*
107	100 *(45)*	10 *(254)*	26 *(660)*	17 *(432)*	36 *(914)*
108	120 *(54)*	12 *(305)*	39 *(991)*	23 *(584)*	45 *(1143)*
110	265 *(120)*	20 *(508)*	64 *(1626)*	40 *(1016)*	69 *(1753)*
112	340 *(157)*	28 *(711)*	86 *(2184)*	64 *(1626)*	100 *(2540)*
206	145 *(66)*	12 *(305)*	35 *(889)*	19 *(483)*	42 *(1067)*
207	207 *(84)*	14 *(356)*	36 *(914)*	23 *(584)*	52 *(1321)*
208	220 *(100)*	17 *(432)*	50 *(1270)*	31 *(787)*	67 *(1702)*
210	345 *(156)*	26 *(660)*	79 *(2007)*	51 *(1295)*	93 *(2362)*
212	515 *(234)*	38 (965)	119 *(3023)*	86 *(2184)*	142 *(3607)*

All weights are in lb. *(kg)*
*Unit weight is cataloged with the largest Open Drip Proof Motor available.

Pre-Start-Up Checks

Check all fasteners for tightness. The blower wheel should rotate freely and not rub on the fan panel venturi. Turn the fan on momentarily to check for unusual vibration or noise. Do not run the fan more than a few seconds without being connected to the system for which it was designed. Motor overloading and burnout may result from lack of system static pressure.

Direction of wheel rotation is critical. Reversed rotation will result in poor air performance, motor overloading and possible burnout. Check wheel rotation by momentarily energizing the unit. Rotation is always in the same direction as airflow at the outlet. See Figure 4.

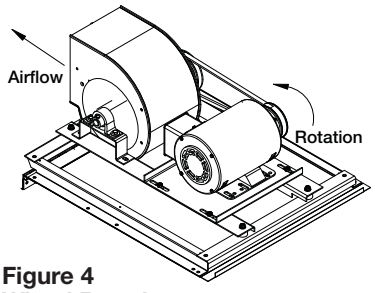


Figure 4
Wheel Rotation

Belt tension should be checked after the first 24 hours of operation, after 100 hours of operation and periodically thereafter. Premature belt failures are frequently caused by improper belt tension (either too tight or loose) or misaligned pulleys. The proper tension for operating a V-belt is the lowest tension at which the belts will not slip.

Belt tension can be adjusted by loosening the four fasteners on the drive frame (pointed out in Figure 5) and sliding the motor base away from the blower housing.

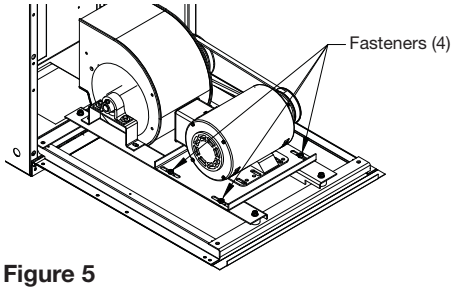


Figure 5
Drive Frame Fasteners

Belt tension should be adjusted to allow 1/64 inch *(0.4 mm)* of belt deflection per inch of belt span. For example, a 16 inch *(406 mm)* belt span should have 15/64 inch or about 1/4 inch *(6.4 mm)* of deflection using moderate thumb pressure at mid-point between pulleys, see Figure 6. Overtightening will cause excessive bearing wear and noise. Too little tension will cause slippage at startup and uneven wear.

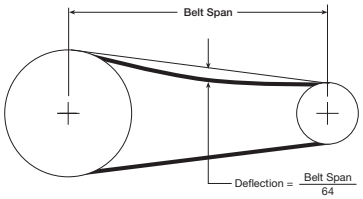


Figure 6
Belt Tension

It is very important that the pulleys remain in proper alignment after adjustments are made. Misalignment of pulleys will result in premature belt wear, noise, vibration and power loss. See Figure 7.

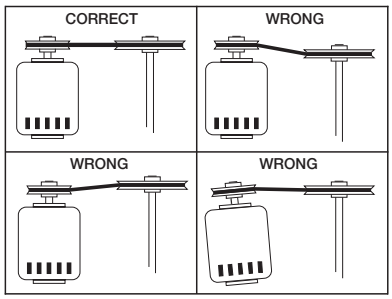


Figure 7
Pulley Alignment

DANGER

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

DANGER

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

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

Items to be included in this program are belts, bearings, motor, wheel(s) and fasteners.

To access the fan motor, drives and blower, simply remove the fasteners attaching the bottom access door and remove door carefully.

Hinged access doors are provided on fan models 106, 107, 206, and 207. Provide support for hinged access doors before removing hex truss fasteners. The door supports weight of the motor, blower, and drive components. Do not remove phillips truss fasteners, as these secure the motor, blower, and drive assembly to the access door.

Bolted access doors are provided on fan models 108, 110, 112, 208, 210, and 212. Bolted access doors do not support weight of any components.

Belts

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. Loosen the sliding motor plate to allow removal of the belt by hand. Do not force belts on or off. This may cause cords to break, leading to premature belt failure. Once installed, adjust belts as shown in “Pre-Start-Up Checks”, Figures 6 and 7 (previous page).

Motor

Motor maintenance is generally limited to cleaning and lubrication (where applicable). Cleaning should be limited to exterior surfaces only. Removing dust and grease build-up on motor housing assures proper motor cooling. Use a brush or vacuum to remove dust. Motors should never be sprayed with water or solvents.

Greasing of the motor is only intended when fittings are provided. Many motors are permanently lubricated and should not be lubricated further.

Motors supplied with grease fittings should be greased in accordance with manufacturer’s recommendations. Use caution not to over lubricate. Oil spillage collects dust and dirt which may obstruct motor cooling openings.

Where motor temperatures do not exceed 104°F *(40°C)*, the grease should be replaced after 2,000 hours of running times as a general rule.

Wheel(s)

Wheels should be inspected for dust and dirt accumulation at each maintenance interval. Left unchecked, dirt may cause wheel imbalance and cause vibration. Keeping the wheel(s) clean helps maintain a smooth and quiet running fan.

Fasteners

Any fan vibration has a tendency to loosen mechanical fasteners. A periodic inspection should include checking all fasteners and set screws for tightness prior to restarting the unit.

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.

Model Sizes 106 thru 112

Note: Only sizes 106 and 107 hinge open as shown.

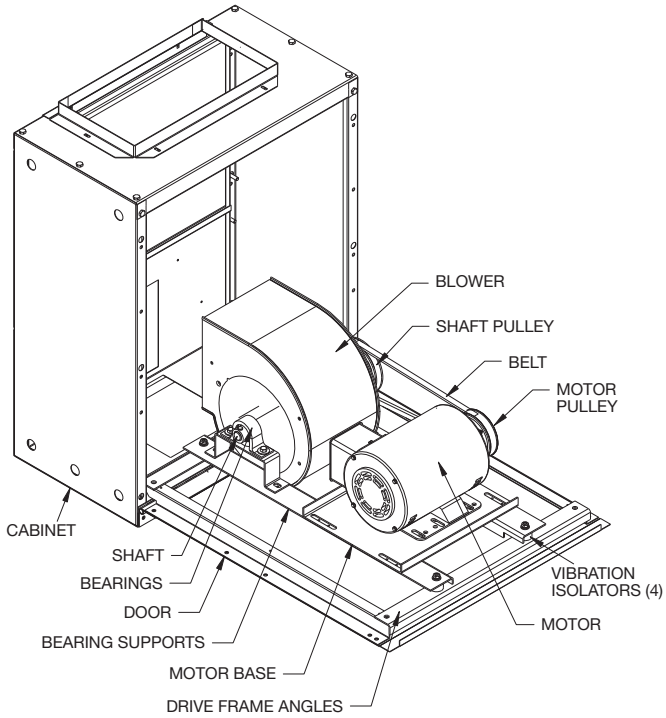


Figure 8
Replacement Parts Single Blower

Model Sizes 206 thru 212

Note: Only sizes 206 and 207 hinge open as shown.

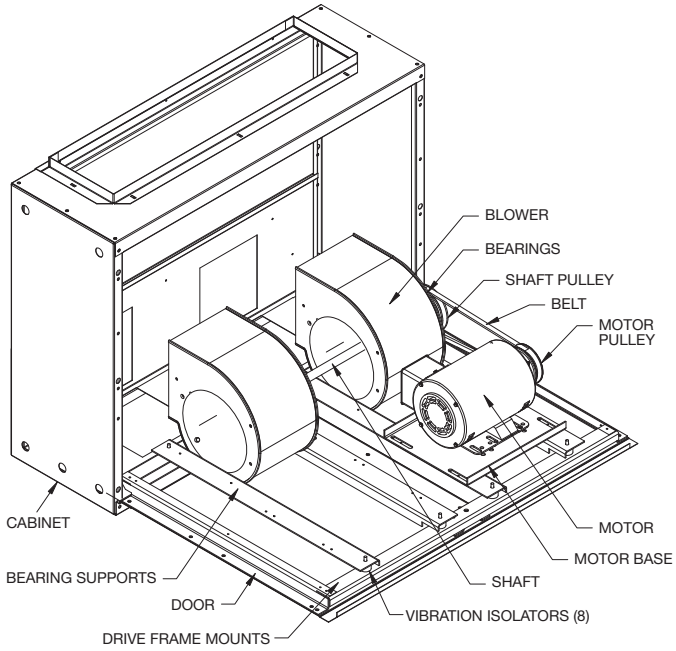
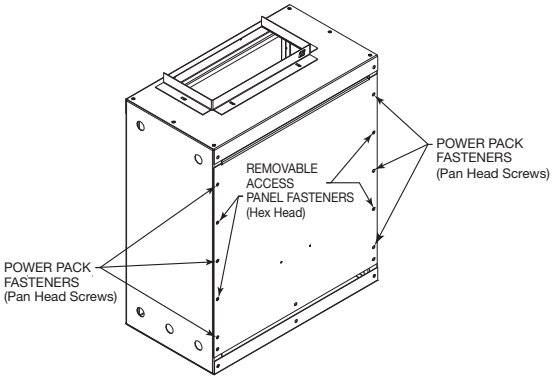
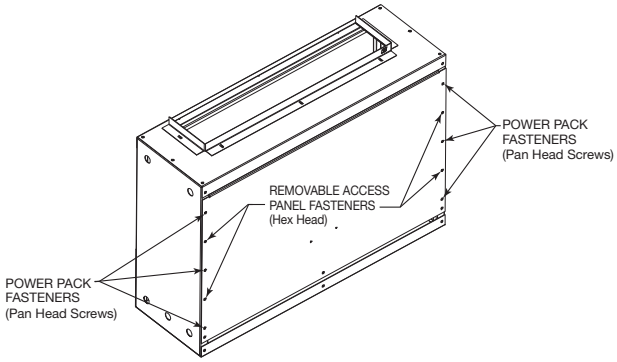


Figure 9
Replacement Parts Double Blower





Troubleshooting

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

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

PROBLEM	CAUSE	CORRECTIVE ACTION
Reduced airflow	System resistance is too high	Check dampers for proper operation. Remove obstructions in ductwork. Clean dirty filters. Check for adequate supply air.
	Unit running backwards	Correct. Adjust as described in "Pre-Start-Up Checks", Figure 4.
	Excessive dirt on wheel	Clean wheel.
	Loose belt or pulleys	Refer to Figure 6 and adjust tension.
Excessive noise	Mechanical looseness	Check all fasteners and set screws for tightness. Check the ductwork for rattles.
	Wheel unbalanced	Check for dirt build-up and clean wheel if required.
	Bad bearings	Replace bearings.
	Incorrect belt tension	Adjust belts as described in "Pre-Start-Up Checks", Figure 6.
	Foreign objects in blower	Remove objects, check for damage or unbalance.
	Defective motor	Replace motor.

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 within the product area tabs and in the Library under Warranties.

Greenheck's Centrifugal Cabinet Fans catalog, Model BCF, 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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