

SAFETY - INSTALLATION - OPERATING AND MAINTENANCE INSTRUCTIONS

Design 38 Cast Aluminum Pressure Blowers



TO ORDER SPARE PARTS:

Spare or repair parts may be ordered from your nearest "Chicago" Sales Engineer by giving the part name, (Wheel, Motor, Bearing, etc.) and the FAN SERIAL NUMBER taken from the nameplate or the JOB ORDER drawings. If possible also give the bearing or shaft size and the fan class. Due to the small number of parts required, spare parts lists are neither necessary nor available. Use these instructions instead.

RECEIVING:

Chicago Blower Corporation equipment is prepared for shipment in accordance with the Uniform Freight Classification. It is thoroughly inspected at the factory and, barring damage in transit, should be in good condition upon arrival.

When a carrier signs Chicago Blower Corporation's bill of lading, the **carrier accepts the responsibility** for any subsequent shortages or damage evident or concealed, and **any claim must be made against the carrier by the purchaser**. Evident shortage or damage should be noted on the carrier's delivery document before signature of acceptance. Inspection by the carrier of damage evident or concealed must be requested. After inspection, issue a purchase order for necessary parts or arrange for return of the equipment to Chicago Blower Corporation factory for repair.

Chicago Blower fans are shipped skidded and may be handled and moved using good rigging techniques, being careful to avoid concentrated stresses that distort any of the parts.

STORAGE:

If the fan installation is to be delayed, store the unit in a dry protected area. Protect the fan, especially fan and motor bearings from moisture and vibration. Protect all machined surfaces such as shafts. Rotate the wheel several revolutions every two weeks stopping the wheel in a position other than its initial position. Keep the bearings fully greased by filling monthly with a grease compatible to that originally supplied. Contact Chicago Blower for extended storage instructions.

SAFETY PRECAUTIONS:

The fan which you have purchased is a rotating piece of equipment and can become a source of danger to life or cause injury if not properly applied. The **maximum operating temperature or speed** for which this fan is designed **must not be exceeded**. These limits are given in our catalog or on Chicago Blower Corporation drawings.

Personnel who will operate this fan, or those who will perform maintenance thereon, **must be given this bulletin to read and warned of the potential hazards of this equipment**.

This pamphlet contains general recommendations, but specific requirements may apply to the individual installation. Such requirements are outlined in federal, state and local safety codes. Strict compliance with these codes, and strict adherence to these installation instructions **are the responsibility of the user**.

ASSEMBLY/ DISASSEMBLY:

The following is general assembly/disassembly instructions for Arrangement 4 fans only. ASSEMBLY INSTRUCTIONS:

1. Mount motor to pedestal bolting together finger tight. (Not applicable for vertical mounted fans.)
2. Caulk and bolt drive cover plate to drive side of housing and inlet cover plate to inlet side of housing. All cover plate hardware must be flat head allen bolts.
3. Screw the teflon shaft seal to inside of drive side cover plate.
4. Bolt the housing half with the drive side cover plate to the c-face of the motor or motor mounting bracket if motor does not have c-face.
5. Tighten motor pedestal mounting bolts. (Not applicable for vertical mounted fans.)
6. Mount wheel to motor shaft and position the wheel so that the set screw over the key is at the bottom. Torque the bottom set screw first and then the opposing set screw next. Torque 5/16" set screw to 70 in/lb and 3/8" set screw to 240 in/lb. Wheel should be centered in the housing.
7. Caulk and bolt housing halves together. Be sure to match up housing halves so that slip discharge is round.

WHEEL REMOVAL:

1. Remove bolts and cut caulk to split apart housing halves.
2. Loosen wheel set screws and remove wheel.
3. To re-assemble, follow steps 6 and 7 under Assembly Instructions.

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DISCHARGE CHANGE:

1. Follow steps 1 and 2 under Wheel Removal.
2. Unbolt housing from c-face of motor or motor mounting bracket if motor does not have a c-face and rotate the housing to the desired discharge position.
3. To re-assemble, follow steps 4 through 7 under Assembly Instructions.

ROTATION CHANGE:

1. Follow steps 1 and 2 under Wheel Removal.
2. Unbolt housing from c-face of motor or motor mounting bracket if motor does not have a c-face.
3. Remove bolts and cut caulk to split apart the inlet cover plate from the inlet side of the housing and the drive cover plate from the drive side of the housing. Switch cover plates between the two housing halves. Be sure to re-caulk between the mating surfaces.
4. To re-assemble, follow steps 4 through 7 under Assembly instructions.

INSTALLATION:

1. Good results **require a proper foundation**. Foundations should be level, rigid, and of sufficient mass for the equipment. Concrete is preferable. Its mass should be at least four times the fan weight. Adequately brace steel platforms in all directions. The minimum natural frequency of any part must be at least 50% higher than the fan running speed.
2. Shim the fan support points before tightening foundation bolts. Do not distort or twist the equipment. Duct connections should be smooth and straight. Elbows and other transitions should be located at least five wheel diameters from fan inlet and outlet (see AMCA Publication 201 for further details). **Flexible connections** to be used at inlet and discharge connections. The **fan should never support or restrain** any duct weight or force.
3. Make sure the power is locked "OFF".
4. Check wheel-to-inlet clearance to make sure it has not shifted during shipment or handling. There should be approximately equal clearance between the housing sides and the wheel. Rotate wheel by hand to check that it runs free.
5. If the wheel is striking, correct it by loosening the hub set screws and reposition the wheel on the shaft. Torque all set screws and turn by hand again.
6. Check the motor wiring and fusing in accordance with the National Electrical Code and local requirements. Follow wiring diagram on the motor nameplates.
7. Chicago Blower requires that all appurtenances, including ductwork or stacks, which are attached to the fan inlet or outlet, be independently supported, unless prior approval has been obtained from Chicago Blower. Excess dead loads or wind loads can distort the fan housing causing misalignment and possible failure. Flexible connections are also necessary to prevent duct expansion or movement from adding loads to the fan.

FAN and MOTOR BEARINGS:

1. Lubricate fan bearings per instructions in packet attached to the fan. Use a premium quality NLG #2 grade multi-purpose grease, such as Shell Alvania Grease 2. Lubricate bearings immediately on receipt. Add enough grease to cause slight purge at seals. It is common for bearings to purge excessive grease during first 24 to 48 hours of operation. See bearing manufacturer's instructions enclosed for lubrication schedule.
2. Bearing must be properly locked to the shaft. Check before operation. Make sure bearing locking collar is in position and set screws are tightened to the bearing manufacturer's recommended torque levels. See bearing manufacturer's instructions enclosed for details. The bearing set screws should be re-torqued after eight and twenty-four hours of operation.

VERTICAL OPERATION:

If the fan is to operate with its shaft vertical, reset the fan bearings as follows:

- a. With the shaft vertical, unlock the drive end bearing set screws and turn the shaft by hand. This allows the wheel end bearing to take the gravity load of the shaft and wheel.
 - b. Re-lock the drive end bearing locking device and replace and torque set screws as required by the bearing manufacturer's instructions so that this bearing now takes only the belt pull.
3. Do not use "hi temp" greases. Many are not formulated for the high speeds associated with fan bearings.

V-BELT DRIVES:

1. Alignment of the drives must be checked with a straightedge or string. Belt tension must be properly adjusted to assure good belt and bearing life. Sheave faces should be parallel and aligned within 1/16". **Use balanced sheaves.**
2. With all belts in their proper grooves, adjust the centers to take up all slack. **Do not tighten belts too tight.** Normal belt tension can be determined by being able to depress belt, at mid-point a distance equal to one belt width, with normal finger pressure. It is normal on V-belt drives handling more than 20 HP to "squeal" on startup.

OPERATION OF FAN:

After installing the fan per these instructions and the instructions of the manufacturers, make final safety checks to prevent injury to personnel or damage to the equipment. **Always block rotating parts to prevent windmilling while inspecting the fan.**

1. Lock power source in "OFF" position.
2. Check bearings for alignment and proper lubrication, with wheel and inside of the housing clean and free of debris.
3. Check wheel position for proper clearance and rotation. Unblock rotating parts and turn wheel by hand to insure that it rotates freely.
4. Check sheave set screws or bushings and wheel set screws for tightness. Check foundation bolts and secure safety guards.
5. Start fan and allow unit to reach full speed, then shut down. During this short period, check for rotation, excessive vibration, any unusual noise, or overheating of the motor. Check the motor amps drawn against the nameplate rating. A plate over the fan inlet will limit the horsepower drawn during a test run with limited ductwork.
6. After the trial run lock the power "OFF".
7. Recheck for tightness of hold-down bolts, wheel set screws and keys, and retighten if necessary. Recheck after eight and twenty-four hours of operation.
8. The run-in period should be at least eight hours. Check bearings a minimum of once each hour during this period. Overgreasing may cause bearings to heat up. There need be no concern if the bare hand can be held on the bearings briefly. Bearings will vent extra grease and cool down after start-up. Recheck torque of all bearing set screws after eight and twenty-four hours of operation to insure levels are maintained per the bearing manufacturer's recommended levels.
10. Take vibration readings at the bearings, or the motor bearings if the fan wheel is mounted directly on the motor shaft. Adhere to these limits. Velocity Limits in inches/second – Normal: .15; Alarm: .22; Shutdown: .5.

MAINTENANCE:

To insure long life and trouble-free service, frequently check all bearing lubrication. See the bearing manufacturer's instructions packed with the fan. Should excessive vibration develop, check the following possibilities:

1. Build-up of dirt or foreign material on the wheel.
2. Loose bolts on bearings, housings, foundation and drive.
3. V-belt drives improperly aligned. Belts must have proper tension, sheaves must be balanced.
4. Check wheel set screws.
5. Foreign matter may have entered fan causing damage to wheel, shaft or bearings.
6. Vibration may be coming from a source other than the fan. Stop the fan and determine if the vibration still exists. Disconnect the driver from the fan and operate it by itself to determine if it produces vibration.
7. Proper clearance between the wheel and the inlet.

A preventive maintenance schedule is a necessity for extending fan life. Establish a lubrication schedule based on time periods suggested in lubrication instructions and by motor and bearing manufacturers.

After approximately one (1) month of operation, all base, hub, bearing, pedestal, etc. bolts should be checked.

Potentially damaging conditions are often signaled in advance by change in vibration and sound. A simple, regular audio-visual inspection of fan operation leads to correction of the condition before expensive damage occurs. Vibration levels should be checked by an approved technician using electronic balancing equipment.

If the fan is to remain idle for an extended period, fill bearing with grease. Protect motor and exposed surfaces. Follow the motor manufacturer's recommendations for storage and rotate the shaft by hand several revolutions each month.

Mechanical Integrity: Certain operating conditions reduce the built-in strength of the fan impeller and may cause unsafe operation. It is the user's responsibility to inspect for these conditions as frequently as necessary and to make corrections as required. Failure to comply with the following limits voids the Chicago Blower Corporation warranty.

Maximum Safe Speed and Temperature: Operation exceeding maximum safe RPM and temperature even for a short time causes overstressing or fatigue cracking of the impeller resulting in unsafe condition. Maximum safe speed and maximum safe temperature are shown on fan assembly drawings, catalogs or order acknowledgement.

Warranty: The warranty on Chicago Blower fans is our standard warranty. The warranty on the motor is that extended by the motor manufacturer.