



SAFETY - INSTALLATION - OPERATING AND MAINTENANCE INSTRUCTIONS

PACKAGED FORCED DRAFT and CUSTOM FANS – ARRANGEMENT 4



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PACKAGED FORCED DRAFT and CUSTOM FANS

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 is not to be installed promptly, store it in a dry place with the motor and wheel protected against moisture, dust, corrosion and physical damage. If the unit must be exposed to weather, contact the Motor manufacturer for special instructions. For long extended storage periods call Chicago Blower for 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. Typically the airstream

temperature must not exceed 150° F.

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**.

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. Flexible connections should be used at inlet and discharge. 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 axial clearance all around and maintain an overlap of the inlet cone and wheel. See Detail. Add "A" to the measured blade tip width for proper set-up of inlet cone to inside of backplate. Rotate wheel by hand to check that it runs free.
8. Recheck for tightness of hold-down bolts, wheel set screws and keys, and retighten if necessary. Recheck after eight hours and again after twenty-four hours of operation.
9. The run-in period should be at least eight hours. Check the motor bearings a minimum of once each hour during this period. Do not overgrease motor bearings. Consult your motor instruction book.

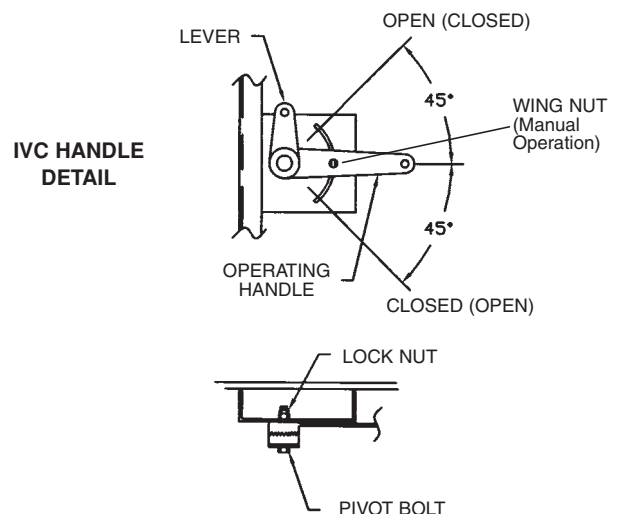
OPERATION OF FAN:

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.**

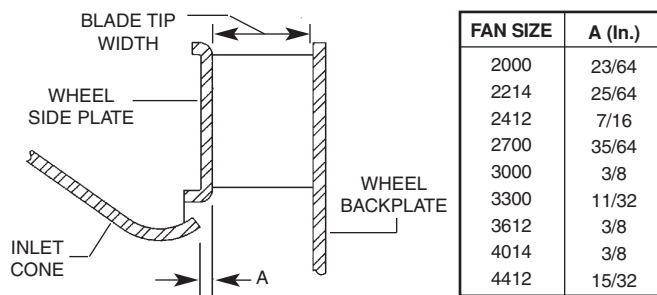
1. Lock power source in "OFF" position
2. Make sure the wheel inside of the fan housing and any ductwork is clean and free of debris.
3. If fan is equipped with optional Inlet Vane Control (IVC), check IVC handle location. See Detail. Handle may have been rotated out of position for shipping purposes. Loosen locknut, rotate handle to position shown on assembly drawing and tighten locknut. **Note: The pivot bolt must be installed to allow free movement of the IVC operating handle.**

Note: Manual operation has an additional wing nut that must be positioned and tightened also.

4. Unblock rotating parts and turn the wheel by hand to **insure that it rotates freely**.
5. Start (bump) fan to check for proper rotation. Rotation is viewed from the drive side (or behind the motor on A/4 fans). If the wheel turns in the wrong direction, reverse motor rotation per motor instructions – usually by interchanging any two leads on a three phase motor.
6. Start fan and allow unit to reach full speed, then shut down. During this short period, check for 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.
7. After the trial run lock the power "OFF".



ARRANGEMENT 4



WHEEL AND INLET CONE OVERLAP DETAIL

- If the wheel is striking, correct it by loosening the hub set screws and reposition the wheel on the shaft, or loosen the motor mounting bolts and realign the wheel to the inlet so it does not hit. Retighten all set screws and bolts and turn by hand again.
- If the fan wheel is fastened with a taper-lock bushing and the wheel must be shifted, follow this procedure:
 - Match mark the bushing and the hub so they can be reinstalled in exactly the same relative position so as to not unbalance the wheel.
 - Remove all bolts from the bushing.
 - Insert two bolts in the threaded holes in the bushing. See Detail. (Note that one bolt is left over and not used in demounting.)
 - Tighten bolts alternately until bushing is loosened in hub. If the bushing does not loosen immediately, lightly tap hub while applying torque to the bolts.

To reinstall the taper-lock bushing in the wheel hub, clean bushing, hub and shaft of all oil, lacquer, grease or dirt, orient bushing to align the match marks and insert the three mounting bolts through the unthreaded bushing holes into the hub. Alternately tighten the bolts.

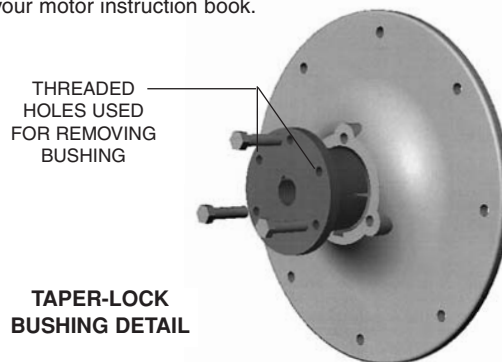
When tightening, the bolts should be turned down equally to the Initial Torque requirement given below. Then tighten the bolts progressively one-half turn per bolt to the Second Torque setting. Finally, the bolts should be tightened in small increments to the Final Torque settings.

Size Bushing	Initial Torque*		Second Torque*		Final Torque*	
	Alum.	Steel	Alum.	Steel	Alum.	Steel
Q & R	57	120	108	240	228	348
P	36	84	72	132	132	192

* Torque values shown are inch lbs. and apply when both components are either aluminum or steel. If either component is aluminum, use values for aluminum. Values for steel are for Grade 5 hardware.

Check bushing to verify type or refer to the bushing box located in the plastic envelope.

- Check the motor wiring and fusing in accordance with the National Electrical Code and local requirements. Follow wiring diagram on the motor nameplates.
- Check motor bearing lubrication. They were lubricated at the factory, but recheck, and if required use a good grade motor lubricant. Consult your motor instruction book.



- Take vibration readings at the motor bearings. Adhere to these limits. Velocity Limits in inches/second – Normal: 0.15; Alarm: 0.22; Shutdown: 0.50. Readings are based at operating speed (filter-in).

MAINTENANCE:

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

- Build-up of dirt or foreign material on the wheel.
- Loose bolts on motor, fan housings or foundation.
- The wheel eroding or corroding..
- Wheel set screws are loose.
- Foreign matter may have entered fan causing damage to wheel.
- Vibration may be coming from a source other than the fan. Stop the fan and determine if the vibration still exists. Disconnect the motor from the fan and operate it by itself to determine if it produces vibration.
- 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 by motor manufacturers.

After approximately one (1) month of operation, all base, hub, motor, 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 air handled by the fan contains corrosive, erosive or sticky materials, fan should be shut down regularly for inspection, cleaning and reconditioning of interior parts.

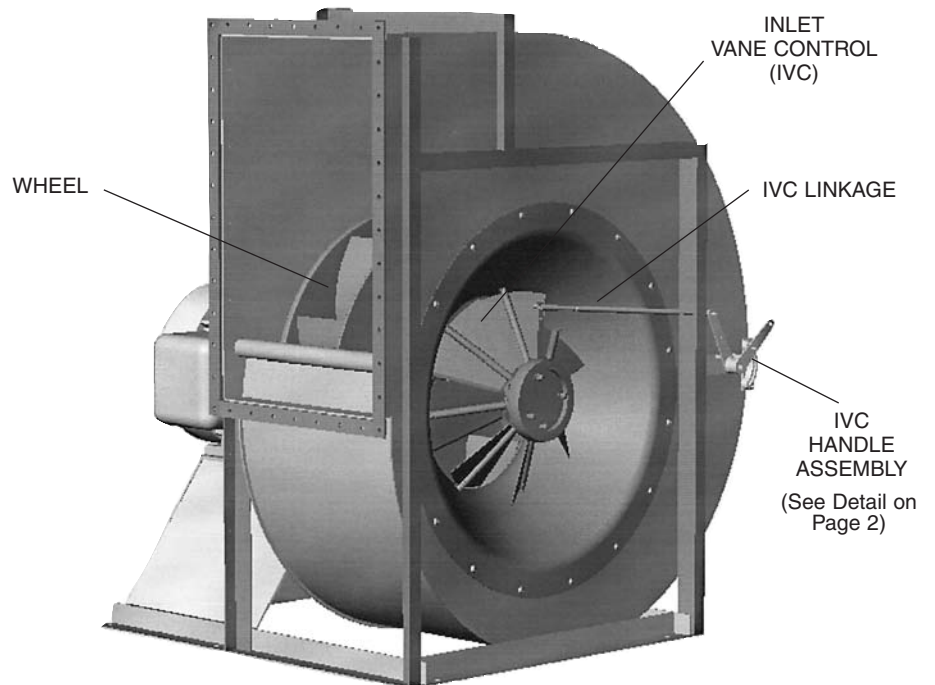
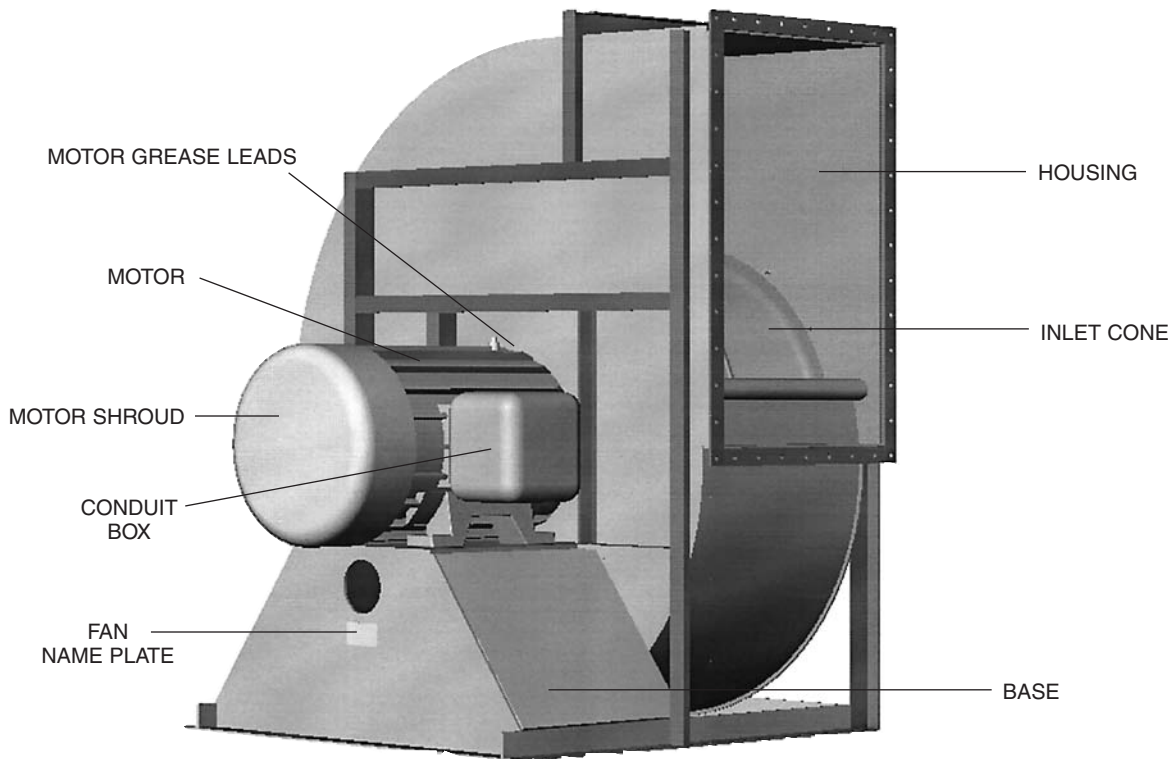
If the fan is to remain idle for an extended period, protect motor and exposed surfaces. Follow the motor manufacturer's recommendations for storage and rotate the shaft by hand several revolutions each month.

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 over-stressing 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. Contact CBC or motor manufacturer for an authorized repair shop.

PRIMARY FAN PARTS



TO ORDER SPARE PARTS:

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