THE NEW YORK BLOWER COMPANY
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INSTALLATION MAINTENANCE, OPERATING INSTRUCTIONS

IM-200

BELT AND DIRECT DRIVE PROPELLER FANS

A WORD ABOUT SAFETY

Air moving equipment involves electrical wiring, moving parts, sound, and air velocity or pressure which can create safety hazards if the equipment is not properly installed, operated and maintained. To minimize this danger, follow these instructions as well as the additional instructions and warnings on the equipment itself.

All installers, operators and maintenance personnel should study AMCA Publication 410, "Recommended Safety Practices for Air Moving Devices", which is included as part of every shipment. Additional copies can be obtained by writing to New York Blower Company, 7660 Quincy St., Willowbrook, IL 60527.

ELECTRICAL DISCONNECTS

Every motor driven fan should have an independent disconnect switch to isolate the unit from the electrical supply. It should be near the fan and must be capable of being locked by maintenance personnel while servicing the unit, in accordance with OSHA procedures.

MOVING PARTS

All moving parts must have guards to protect personnel. Safety requirements vary, so the number and type of guards needed to meet company, local and OSHA standards must be determined and specified by the user. Never start a fan without having all safety guards installed. Check regularly for damaged or missing guards and do not operate any fan with guards removed. Fans can also become dangerous because of potential “windmilling”, even though all electrical power is disconnected. Always block the rotating assembly before working on any moving parts.

SOUND

Some fans can generate sound that could be hazardous to exposed personnel. It is the responsibility of the system designer and user to determine sound levels of the system, the degree of personnel exposure, and to comply with applicable safety requirements to protect personnel from excessive noise. Consult **nyb** for fan sound power level ratings.

AIR PRESSURE AND SUCTION

In addition to the normal dangers of rotating machinery, fans present another hazard from the suction created at the fan inlet. This suction can draw materials into the fan where they become high velocity projectiles at the outlet. It can also be extremely dangerous to persons in close proximity to the inlet, as the forces involved can overcome the strength of most individuals. Inlets and outlets that are not ducted should be screened to pre-vent entry and discharge of solid objects.

RECEIVING AND INSPECTION

The fan and accessories should be inspected on receipt for any shipping damage. Turn the propeller by hand to see that it rotates freely and does not bind. If shutters are provided, check these accessories for free operation of all moving parts.

F.O.B. factory shipping terms require that the receiver be responsible for inspecting the equipment upon arrival. Note damage or shortages on the Bill of Lading and file any claims for damage or loss in transit. **nyb** will assist the customer as much as possible; however, claims must be originated at the point of delivery.

HANDLING AND STORAGE

Fans should be lifted by the panel mounting flanges only. Never lift a fan by the propeller, shaft, motor, motor bracket, panel inlet or any fan part not designed for lifting. A spreader should be used to avoid damage.

Whenever possible, fans and accessories should be stored in a clean, dry location to prevent rust and corrosion of steel components. If outdoor storage is necessary, protection should be provided. The fan should be covered to prevent the accumulation of dirt and moisture. Cover motors with waterproof material. Refer to the bearing section for further storage instructions.

Check shutters for free operation and lubricate moving parts prior to storage. Inspect the stored unit periodically. **Rotate the propeller by hand every two weeks to redistribute grease on internal bearing parts.**

FAN INSTALLATION

nyb propellers are dynamically balanced when fabricated. Complete fans are test run at operating speeds to check the entire assembly for conformance to **nyb** vibration limits. Nevertheless, all units must be adequately supported for smooth operation.

Rough-in wall opening of sufficient size so that, when framed in, the finished opening will accept the fan. It is preferable to frame in the opening with 2 x 6 material, or other similar suitable material or metal channels adequate to support the fan as shown in Figure 1. Slide the fan into the framed opening in the wall. Securely fasten with bolts or screws around the fan panel. A distance of at least one and one-half times the diameter of the fan should be allowed between the fan inlet or discharge opening and any adjacent wall or large obstruction. Additional framing may be necessary for optional shutters.

If shutters are used, they should be mounted in such a way that the blades are in a horizontal position and overlap like shingles on the side exposed to the weather. The motor on motorized shutters and the tie rods on automatic shutters should face the inside. To install, butt the shutter flange up to the wooden frame on the outside of the wall and secure it with lag screws. Do not bend or twist the shutter frame when tightening the screws. Once the shutter is installed, be certain that the blades open and close freely.

If the shutter is motorized, wire the motor. **When supply type fans are used with motorized shutters, it is necessary that a time delay switch be used between the power source and the fan motor to provide time for the shutter to open fully before the fan is activated.**

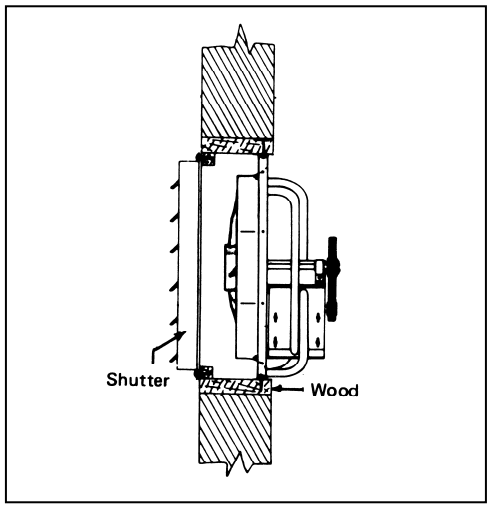


Figure 1

V-BELT DRIVE Installation (Bare Fans/Replacement)

1. Remove all foreign material from the fan and motor shafts. Coat shafts with machine oil for easier mounting.

2. Mount sheaves on shafts after checking sheave bores and bushings for nicks or burrs. Avoid using force. If resistance is encountered, lightly polish the shaft with emery cloth until the sheave slides on freely.

3. Adjust the motor on its base to a position closest to the fan shaft. Install belts by working each one over the sheave grooves until all are in position. Never pry the belts into place. Sufficient motor adjustment is provided for easy installation of the proper size belts.

4. Adjust sheaves and the motor shaft angle so that the sheave faces are in the same plane. Check this by placing a straightedge across the faces of the sheaves. Any gap between the edge and sheave faces indicates misalignment. Important: This method is only valid when the width of the surface between the belt edge and the sheave face is the same for both sheaves. When they are not equal, or when using adjustable-pitch sheaves, adjust so that all belts have approximately equal tension. Both shafts should be at right angles to the center belt.

Belt Tensioning

1. Check belt tension with a tensioning gage and adjust using the motor slide base. Insufficient tension shortens belt life, can reduce fan performance and may cause vibration. Excess tension shortens bearing life. The lowest allowable tension is that which prevents slippage under full load. Belts may slip during start-up, but slipping should stop as soon as the fan reaches full speed. For more precise tensioning methods, consult the drive manufacturer's literature.

2. Recheck setscrews, rotate the drive by hand and check for rubbing, then complete the installation of optional guards.

3. Belts tend to strecth somewhat after installation. Recheck tension after several days of operation. Check sheave alignment, as well as setscrew and/or bushing bolt tightness.

START-UP

Safe operation and maintenance includes the selection and use of appropriate safety accessories for the specific installation. This is the responsibility of the system designer and requires consideration of equipment location and accessibility as well as adjacent components. All safety accessories must be installed properly prior to start-up.

Safe operating speed is a function of system temperature and propeller design. Do not under any circumstances exceed the maximum safe fan speed published in the **nyb** bulletin, which is available from your **nyb** field sales representative.

Procedure

1. If the drive components are not supplied by **nyb,** verify with the manufacturer that the starting torque is adequate for the speed and inertia of the fan.

2. Inspect the installation prior to starting the fan. Check for any loose items or debris that could be drawn into the fan or dislodged by the fan discharge. Turn the propeller by hand to check for binding.

3. Check drive installation and belt tension.

4. Check the tightness of all setscrews, nuts and bolts. When furnished, tighten hub setscrews with the propeller oriented such that the setscrew is positioned underneath the shaft.

5. Install all remaining safety devices and guards. Verify that the supply voltage is correct and wire the motor. “Bump” the starter to check for proper propeller rotation.

6. Setscrews should be rechecked after a few minutes, eight hours and two weeks of operation (see Table 1 for correct tightening torques).

NOTE: Shut the fan down immediately if there is any sudden increase in fan vibration.

WHEEL SETSCREW TORQUES

Setscrew Diameter (in.)	Carbon Steel Setscrew Torque	
	lb. - in.	lb. - ft.
1/4	75	6.2
5/16	144	12
3/8	252	21
7/16	393	33
1/2	600	50

FAN MAINTENANCE

nyb fans are manufactured to high standards with quality materials and components. Proper maintenance will ensure a long and trouble-free service life.

Do not attempt any maintenance on a fan unless the electrical supply has been completely disconnected and locked. In many cases, a fan can windmill despite removal of all electrical power. The rotating assembly should be blocked securely before attempting maintenance of any kind.

The key to good fan maintenance is regular and systematic inspection of all fan parts. Inspection frequency is determined by the severity of the application and local conditions. Strict adherence to an inspection schedule is essential.

Regular fan maintenance should include the following:

1. Check the fan propeller for any wear or corrosion, as either can cause catastrophic failures. Check also for the build-up of material which can cause imbalance resulting in vibration, bearing wear and serious safety hazards. Clean or replace the propeller as required.

2. Check the V-belt drive for proper alignment and tension (see section on V-belt drives). If belts are worn, replace them as a set, matched to within manufacturer’s tolerances.

3. Fans with standard captured bearings in formed housing require no service.

4. During any routine maintenance, all setscrews and bolts should be checked for tightness. See the table for correct torques.

5. When installing a new propeller, the propeller should be positioned in the housing with even spacing between the edge of the orifice and the propeller.

PROPELLER BALANCE

Airstreams containing particulate or chemicals can cause abrasion or corrosion of fan parts. This wear is often uneven and can lead to significant propeller imbalance over time. When such wear is discovered, a decision must be made to rebalance or replace the propeller.

The soundness of all parts should be determined if the original thickness of components is reduced. Be sure there is no hidden structural damage. The airstream components should also be cleaned to remove any build-up of foreign material. Specialized equipment can be used to rebalance a cleaned propeller that is considered structurally sound.

Balance weights should be rigidly attached at a point that will not interfere with other fan components nor disrupt airflow. Remember that centrifugal forces can be extremely high at the outer radius of a fan propeller.

BEARINGS

Storage

Any stored bearing can be damaged by condensation caused by temperature variations. Therefore, **nyb** fan bearings are filled with grease at the factory to exclude air and moisture. Such protection is adequate for shipment and subsequent immediate installation.

For long term or outdoor storage, mounted bearings should be regreased and wrapped with plastic for protection. **Rotate the fan propeller by hand at least every two weeks to redistribute grease on internal bearing parts.**

Disposal of material should be made in accordance to local government regulations.

Operation

Check the setscrew torque before start-up (see table for correct values). Since bearings are completely filled with grease at the factory, they may run at an elevated temperature during initial operation. Surface temperatures may reach 180°F. This is normal. Bearing surface temperatures will decrease when the internal grease quantity reaches a normal operating level.

Replacement

If captured bearings need replacement, install new bearings into neoprene rings, check correct position of propeller with orifice, position bearings in die-formed recess and tighten setscrews. Replace die-formed bearing cap and tighten four bolts.

COMMON FAN PROBLEMS

Excessive Vibration

A common complaint regarding industrial fans is “excessive vibration”. **nyb** is careful to ensure that each unit is precisely balanced prior to shipment; however, there are many other causes of vibration including:

1. Loose mounting bolts, setscrews, or bearings.
2. Misalignment or excessive wear of bearings.
3. Misaligned or unbalanced motor.
4. Bent shaft due to mishandling or material impact.
5. Accumulation of foreign material on the propeller.
6. Excessive wear or erosion of the propeller.
7. Excessive system pressure or restriction of airflow due to closed shutters.
8. Inadequate structural support, mounting procedures or materials.
9. Externally transmitted vibration.

Inadequate Performance

1. Incorrect testing procedures or calculations.
2. Fan running too slowly.
3. Propeller rotating in wrong direction.
4. Propeller not properly centered relative orifice.
5. Poor system design or closed shutters.
6. Obstruction near inlet or outlet.
7. Sharp deflection of airstream at fan inlet or outlet.

Excessive Noise

1. Fan operating near “stall” due to incorrect system design or installation.
2. Vibration originating elsewhere in the system.
3. System resonance or pulsation.
4. Improper location or orientation of fan intake and discharge.
5. Inadequate or faulty design of supporting structures.
6. Nearby sound reflecting surfaces.
7. Loose accessories or components.
8. Loose drive belts.
9. Worn bearings.

Premature Component Failure

1. Prolonged or major vibration.
2. Inadequate or improper maintenance.
3. Abrasive or corrosive elements in the airstream or surrounding environment.
4. Misalignment or physical damage to rotating components or bearings.
5. Bearing failure from incorrect or contaminated lubricant.
6. Excessive fan speed.
7. Extreme ambient or airstream temperatures.
8. Improper belt tension.
9. Improper tightening of propeller setscrews.

REPLACEMENT PARTS

It is recommended that only factory-supplied replacement parts be used. **nyb** fan parts are built to be fully compatible with the original fan, using specific alloys and tolerances. These parts carry a standard **nyb** warranty.

When ordering replacement parts, specify the part name, **nyb** shop and control number, fan size, type, arrangement, and bore. Most of this information is on the nameplate attached to the fan.

For assistance in selecting replacement parts, contact your local **nyb** representative or visit: http://www.nyb.com.

Example: Part required: Propeller
Shop/control number: B-10106-100
Fan description: ED30

Suggested replacement parts include:

Propeller	Component parts: Shutter
Shaft	Motor
Bearing Assembly	V-Belts

LIMITED PRODUCT WARRANTY

All products are warranted by **nyb** to be free from defects in materials and workmanship for a period of one (1) year after shipment from its plant, provided buyer demonstrates to satisfaction of **nyb** that the product was properly installed and maintained in accordance with **nyb**'s instructions and recommendations and that it was used under normal operating conditions.

This warranty is limited to the replacing and/or repairing by **nyb** of any part or parts which have been returned to **nyb** with **nyb**'s written authorization and which in **nyb**'s opinion are defective. Parts not manufactured by **nyb** but installed by **nyb** in equipment sold to the buyer shall carry the original manufacturer’s warranty only. All transportation charges and any and all sales and use taxes, duties, imports or excises for such part or parts shall be paid for by the buyer. **nyb** shall have the sole right to determine whether defective parts shall be repaired or replaced.

This warranty does not cover any customer labor charges for replacement of parts, adjustments or repairs, or any other work unless such charges shall be assumed or authorized in advance, in writing, by **nyb.**

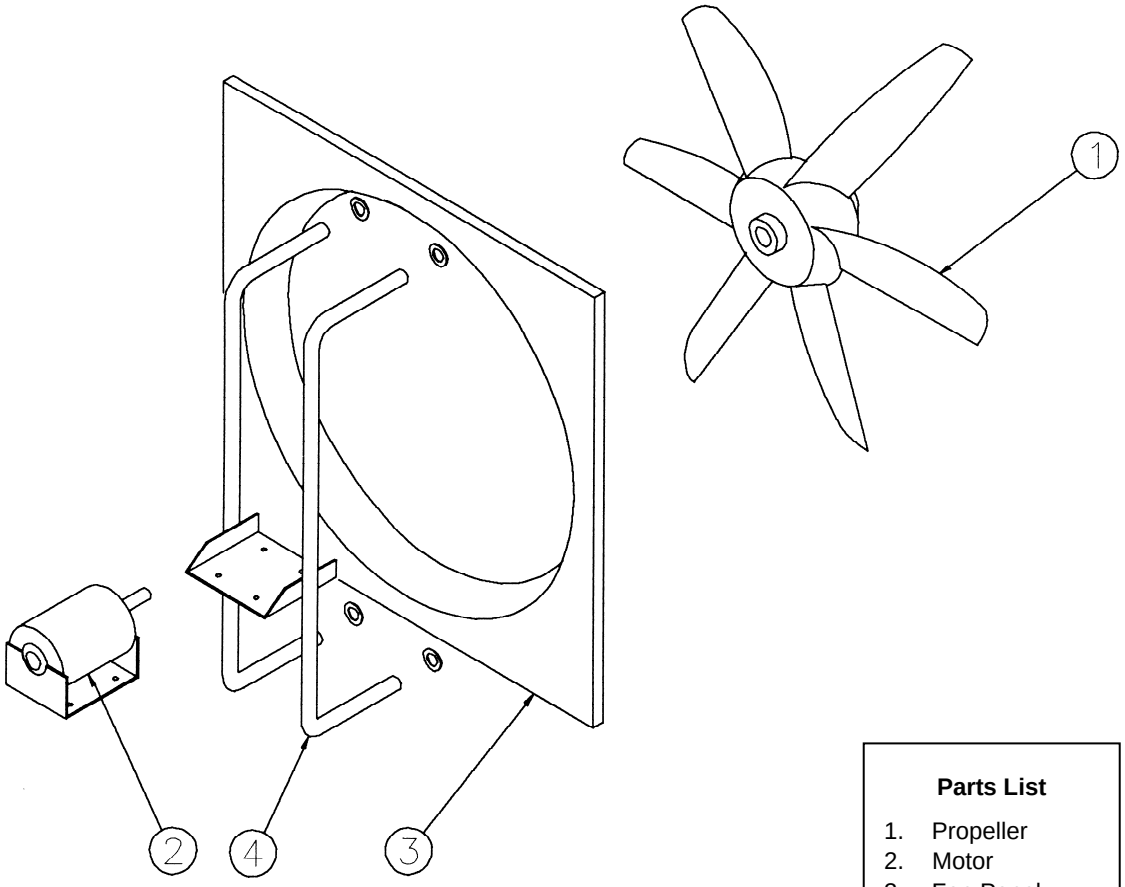
This warranty does not cover any product which, in the judgement of **nyb,** has been subject to misuse or neglect, or which has been repaired or altered outside **nyb**'s plant in any way which may have impaired its safety, operation or efficiency, or any product which has been subject to accident.

This warranty shall be null and void if any part not manufactured or supplied by **nyb** for use in any of its products shall have been substituted and used in place of a part manufactured or supplied by **nyb** for such use.

There are no warranties, other than those appearing on the acknowledgement form **INCLUDING NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE,** given in connection with the sale of the goods sold hereunder. The buyer agrees that his sole and exclusive remedy, and the limit of **nyb**'s liability for loss from any cause whatsoever, shall be the purchase price of the goods sold hereunder for which a claim is made.

The New York Blower Company 7660 Quincy Street Willowbrook, Illinois 60527-5530

DIRECT DRIVE
MODEL F
PROPELLER FAN

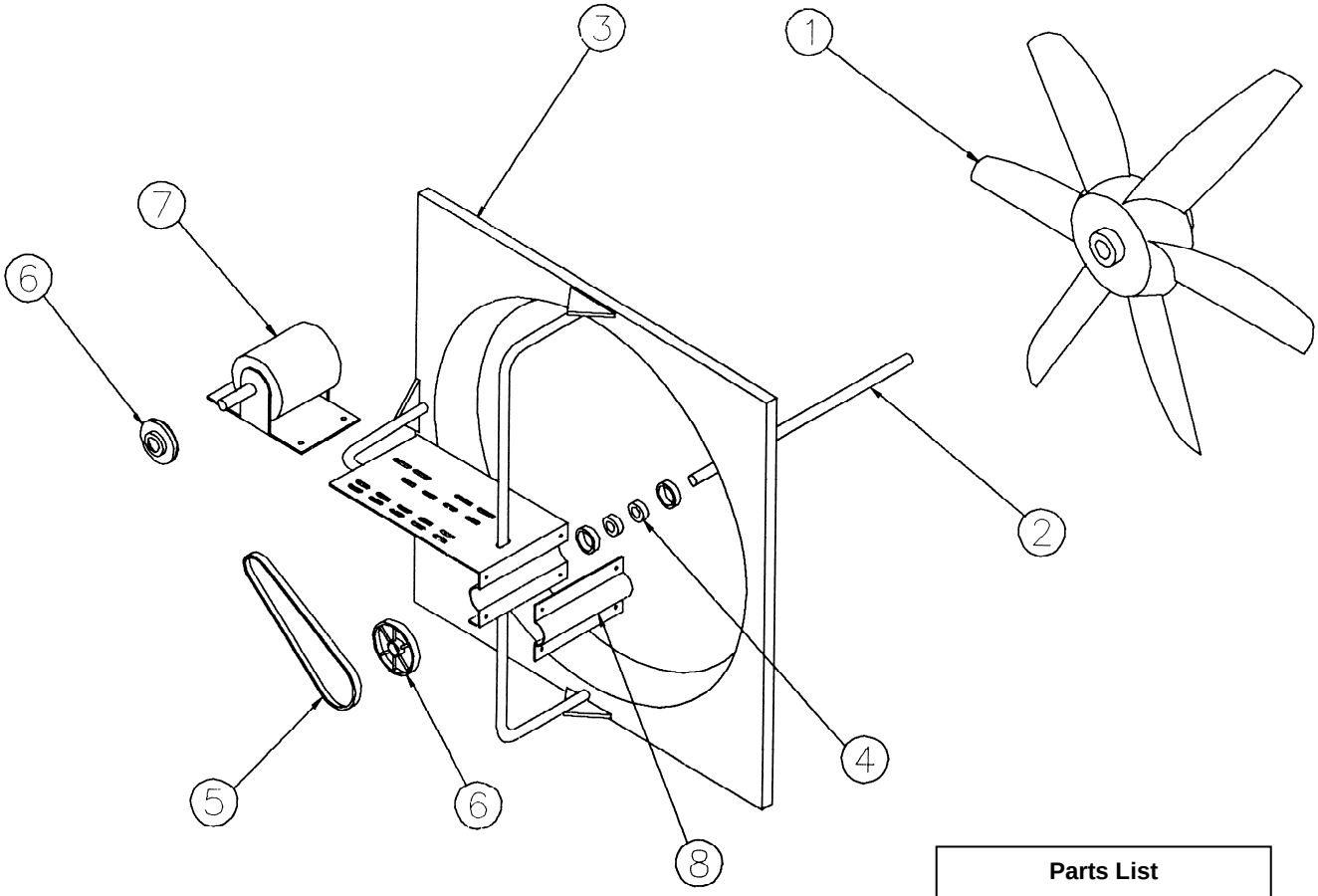


Parts List

1. Propeller
2. Motor
3. Fan Panel
4. Fan Frame

For assistance in selecting replacement parts, contact your local **nyb** representative or visit: http://www.nyb.com.

BELT DRIVE
MODEL D
PROPELLER FAN



Parts List

1. Propeller
2. Shaft
3. Fan Frame
4. Bearings
5. Belt
6. Sheaves
7. Motor
8. Bearing Cap

For assistance in selecting replacement parts, contact your local **nyb** representative or visit: http://www.nyb.com.