



INSTALLATION & MAINTENANCE INSTRUCTIONS

Models PL & USPL

RECEIVING AND INSPECTION

Immediately upon receipt of a shipment, carefully inspect for damage and shortage. Turn the impeller by hand to see that it turns freely and does not bind. If any damage and/or shortage is detected or suspected, the carrier must be asked to conduct an inspection. The consignee's representative should not accept a shipment without a notation on the delivery receipt indicating items not delivered or the apparent extent of damage.

When a shipment is opened and damage is found which was not evident externally (concealed damage), it is mandatory that the consignee request an immediate inspection by the carrier. Report any damage to the carrier within 15 days. Failure to report damage within the above time limit will result in rejection of a claim.

HANDLING

When handling fans and their accessories, always use equipment and methods that will not cause damage. Fans should be lifted using slings and padding or spreaders to avoid damage.

CAUTION! Always make sure that all lifting and handling equipment and techniques conform to current safety standards.

Avoid lifting fans in a way that will bend or distort fan parts. Never pass slings or timbers through the orifices of fan.

CAUTION! Do not lift by the fan hood. Fans with special coatings or paints must be protected in handling to prevent damage.

STORAGE

Fans are protected against damage during shipment. If they cannot be installed and put into operation immediately upon receipt certain precautions are necessary to prevent deterioration during storage. Responsibility for integrity of fans and accessories during storage must be assumed by the user. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user, who shall make the decision whether to use any or all of them.

INDOOR: The ideal storage environment for 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 70°F and 105°F (wide temperature swings may cause condensation and "sweating" of metal parts). Windows should be covered to prevent temperature variations caused by sunlight. Provide thermometers and humidity indicators at several points and maintain the atmosphere at 40% relative humidity, or lower.

It may be necessary to use trays of renewable desiccant or portable dehumidifier to remove moisture from the air in the storage enclosure.

Thermostatically controlled portable heaters (vented to outdoors) may be required to maintain even temperatures inside the enclosure.

CAUTION! Provide fire extinguishers, fire alarms, or emergency response communication to protect building and equipment against fire damage. Be sure that building and storage practices meet all local, state and federal fire and safety codes.

The following fans or accessories must be stored indoors, in a clean dry atmosphere:

- a. Propeller wall fans not in wall housings.
- b. Any fan that is protected by a cardboard carton.
- c. Motors dismounted from fans.
- d. Spare wheels or propellers.
- e. Belts, sheaves, bushings and other parts when not mounted on fan.
- f. Boxes, bags or cartons of hardware.
- g. Curbs
- h. Dampers

Remove any accumulations of dirt, water, ice or snow and wipe dry before moving indoors. Allow cold parts to reach room temperature to avoid "sweating" of metal parts. Open boxes or cartons. Remove any accumulated moisture; if necessary use portable electric heaters to dry parts and packages. Leave coverings loose to permit air circulation and to permit periodic inspection.

Rotate impeller by hand to distribute bearing grease over the entire bearing surfaces.

Store at least 3 ½" off the floor on wooden blocks covered with moisture proof paper or polyethylene sheathing. Provide aisles between parts and along all walls to permit air circulation and space for inspection.

OUTDOOR: Fans designed for outdoor use may be stored outdoors, if absolutely necessary. The storage area should be reasonably level and drained or ditched to prevent accumulation of water. Fencing and lighting for security are desirable. Roads or aisles for portable cranes and hauling equipment are needed. Consider the use of drift fencing to minimize accumulation of blowing snow or dirt.

The following fans may be stored outdoors, if dry indoor storage space is not available:

- a. Fans intended for outdoor use that are crated in wood.
- b. Wall fans installed in wall housings.

All fans must be supported on wooden blocks or timbers above water or normal snow levels. Provide enough blocking to prevent settling into soft ground. Fans should be set in place using the directional arrow markings on the crate as a guide.

Locate pieces far enough apart to permit air circulation, sunlight, and space for periodic inspection. Place all parts on their supports so that rain water will run off, or to minimize water accumulation. **Do not** cover parts with plastic film or tarps — these cause condensation of moisture from the air passing through heating and cooling cycles.

Fan impellers should be blocked to prevent spinning caused by strong winds.

INSPECTION AND MAINTENANCE DURING STORAGE

Inspect fans and accessories at least once per month, while in storage. Log results of inspection and maintenance performed. A typical log entry should include the following:

- a. Date
- b. Inspector's Name
- c. Name of Fan
- d. Location
- e. Condition of Paint or Coating
- f. Is moisture present?
- g. Is dirt accumulated?
- h. Corrective steps taken?

If moisture or dirt accumulations are found on parts, the source should be located and eliminated. Fan impellers should be rotated at each inspection by hand ten to fifteen revolutions to redistribute the motor and bearing lubricant.

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. The most critical items are pulleys, shafts and bearing locking collars. At the first sign of rusting on any of the above parts, remove the original rust preventive coating with petroleum solvent and clean lint-free cloths. Polish any remaining rust from surfaces with crocus cloth or fine emery paper and oil. **Do not** destroy the continuity of the surfaces. Wipe clean with lint-free cloths and recoat surfaces evenly and thoroughly with Tectly 506 (Ashland Oil Company) or equal. For hard to reach internal surfaces or for occasional use, consider using Tectly 511M Rust Preventive or WD40 or equal.

REMOVING FROM STORAGE

As fans are removed from storage to be installed in their final location, they should be protected and maintained in similar fashion, until the fan equipment goes into operation.

INSTALLATION

1. **CAUTION!** This unit has rotating parts and safety precautions should be exercised during installation, operation and maintenance.
2. **WARNING! Do not** use fans in hazardous environments where fan's electrical system could provide ignition to combustible or flammable materials, unless the unit is specifically built for hazardous environment.
3. If prefab curb is used, damper will mount on the damper flange provided as part of the curb. Damper should be installed before setting Exhauster.
4. If damper box is being used, assemble box and mount in curb before setting Exhauster. Damper may be installed at this time if desired. Damper should be fastened to the bottom of the damper box, curb flanges or nailing strips in curb.
5. Remove motor compartment cover and mount motor if required. Remove motor base bolts and lift motor base from adjusting rails, secure motor to base with bolts provided and replace on rails. Install belt and check pulley alignment and belt tension. Belt should depress its width when pressed firmly inward at midway point between the pulleys.

6. Remove shipping blocks from under adjusting rails.
7. Turn impeller by hand to make sure it rotates freely. If impeller hits orifice, adjust as follows:

Loosen nuts on both sides of vibration isolators and move adjusting rails to realign the impeller. If impeller continues to strike, move impeller and shaft up. The bearing support structure for models 135 through 300 is slotted for up and down adjustment. Models 330 through 543 require sliding the shaft through the bearings. (See Maintenance Section, No. 7 for bearing replacement.)
8. **CAUTION!** Guards must be installed when fan is within reach of personnel or within seven (7) feet (2.134 m) of working level or when deemed advisable for safety.
9. **CAUTION!** Before proceeding, make sure electrical service to fan is locked in "OFF" position. Run wires through the internal wiring post to the motor to disconnect switch if used. **WARNING!** The wiring post is sealed to the curbcap with a large washer and sealing gasket. If the wiring post is loosened, the seal may be broken, thereby creating a possible water leak. Leave enough slack in wiring to allow for motor movement when adjusting belt tension. Some fractional motors will have to be removed to make connection at terminal box on end of motor; remove bolts securing motor base to adjusting rails — do not take out motor bolts. Re-adjust belt tension.
10. All wiring should be in accordance with local ordinances and the National Electric Code.
11. **WARNING!** Check voltage at the fan to see if it corresponds with the motor nameplate; high or low voltage can seriously damage the motor. Extra care should be taken when wiring two or three speed motors since improper connections will damage motor and void motor warranty.

12. Operate under power and compare rotation with directional arrow. **WARNING!** Operation in the wrong direction will deliver air but will overload the motor to the extent of blowing fuses, overload protection and could seriously damage the motor. In the case of three phase motors, the direction can be changed by interchanging any two of the three motor leads. In the case of single phase motors, the reversing instructions will appear on the wiring diagram located either in the motor wiring compartment or on the outside of the motor housing.
13. Using a minimum of eight (8) lag bolts — two on each side near corners, securely fasten exhauster to curb. The fan should rest on the curb as level as possible.

MAINTENANCE

1. Under normal usage, no spare parts are recommended for one year of operation.
2. **CAUTION!** Before proceeding, make sure electrical service to fan is locked in the "OFF" position.

WINDMILLING: Even when the power supply is locked out, fans may cause injury or damage if the impeller is subject to "windmilling" which is the turning of the impeller and drive components due to a draft in the system. To guard against this hazard, the impeller should be secured to physically restrict rotational movement.

3. Duplex split pillow block bearings are prelubricated, sealed and require no service.

Optional unitary pillow block bearings with external lubrication fittings under normal operating conditions will need no relubrication for 3 to 5 years. For normal operating condition, use a grease conforming to NLGI No. 2. **Caution!** Lubricating bearings with a high pressure gun which can blow bearing seals and overfill the bearing with grease. This condition can result in excessive churning and overheating. For normal operating conditions it is standard practice to fill only 30% of the bearing void with grease. **Do not** over lubricate.

4. Motor bearings are prelubricated. Consult information printed on motor for lubrication instructions.
5. Check belt tension after first 48 hours of operation and thereafter annually. Belt should depress its width when pressed firmly inward at midway point between the pulleys. Too much tension will damage bearings. The belt should be tight enough to prevent slippage. When replacing worn belt, replace motor pulley if "shoulder" is worn in groove. **WARNING! Do not** replace the motor pulley with a larger diameter pulley. **Do not** replace fan pulley with one smaller in diameter. The pulley ratios are set so that the motor will not be overloaded. **Do not** operate at higher speeds than rated in catalog.
6. If motor requires replacement, one comparable to the original with the same service factor and enclosure must be used.
7. If impeller shaft bearings need replacement, replace with bearings that are comparable to the original equipment.

For die-formed type support housing (duplex split pillow block bearings), install new bearings into the neoprene rings, check correct position of impeller with the fan housing, position the bearings in die-formed recess and tighten the set screws. Replace the die-formed bearing cap and tighten the four bolts.

NOTE: If unitary pillow block type bearings are used, slide bearings on to the shaft to desired location and bolt the bearing block securely to the support base. Slide the shaft back and forth in secured bearing (do not drive with a hammer) and rotate to make certain that it turns freely. Check the correct position of the impeller in tube or orifice. Impeller should not strike any part of the fan housing and tip clearance between the impeller and the tube should be the same at each blade tip.

PROCEDURE FOR TIGHTENING SET SCREWS IN BEARINGS AND HUBS

One Set Screw Application

Using a torque wrench, tighten the set screw to the torque recommended in Table 1.

Two Set Screw Application

1. Using a torque wrench, tighten one set screw to half of the torque recommended in Table 1.
2. Tighten the second set screw to the full recommended torque.
3. Tighten the first set screw to the full recommended torque.

Table 1. Recommended Tightening Torque for Set Screws

Set Screw Diameter	Torque (in-lbs)
#10	35
1/4	80
5/16	126
3/8	240
7/16	384
1/2	744
9/16	1080
5/8	1500
3/4	2580
7/8	3600
1	5400

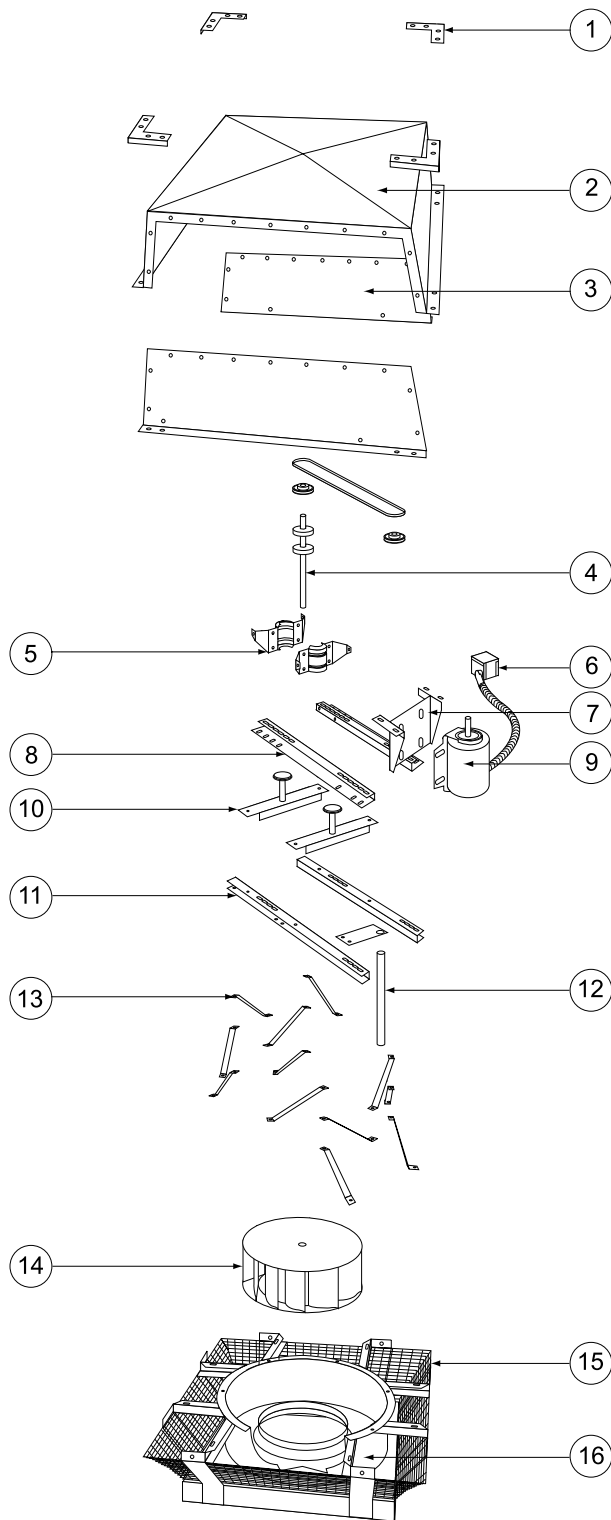
VARIABLE FREQUENCY DRIVES AND MOTORS

There are occasions when a Variable Frequency Drive (VFD) will cause poor motor performance and possible damage. To avoid these problems, the Company recommends the following:

1. Select compatible motor and VFD converter; if possible, the motor and the converter should be from the same manufacturer or at least the converter selected should be recommended by the motor manufacturer.
2. A motor shaft grounding system should be used to prevent motor bearing damage from eddy currents.

NOTE: The Company will not honor motor warranty claims if the customer fails to follow these recommendations.

Exploded View



Parts List					
Ref. No.	Description	Qty.	Ref. No.	Description	Qty.
1	Hood Corner Piece	4	9	Motor	1
2	Hood Top & Sides	1	10	Hood Support	2
3	Hood End	2	11	Lower Channel	2
4	Shaft and Bearing Assembly	1	12	Wiring Post	1
5	Bearing Cap	2	13	S Brackets	*
6	Disconnect Switch	1	14	Impeller	1
7	Motor Base	1	15	Birdscreen	1
8	Upper Channels	2	16	Curb & Orifice Assembly	1

*Quantity varies per fan size.

WHEN ORDERING REPLACEMENT PARTS, LIST MODEL, DESCRIPTION AND QUANTITY.

TERMS AND CONDITIONS

DESIGN CHANGES The Company reserves the right to make changes in design, improvements and additions in and to its products any time without imposing any liability or obligations to itself to apply or install the same in any product manufactured by it.

TITLE The title and right of possession of the equipment sold herein shall remain with the Company and such equipment shall remain personal property until all payments herein (in-

cluding deferred payments whether evidenced by notes or otherwise) shall have been made in full in cash and the Purchaser agrees to do all acts necessary to perfect and maintain such right and title in the Company.

SAFETY ACCESSORIES The Company manufactures equipment designed to serve multiple applications and offers a wide range of safety equipment, including guards and other devices, as may be required to meet customer specifica-

tions. Without exception, the Company recommends that all orders include applicable safety devices. Equipment ordered without applicable safety devices is clearly the responsibility of the Purchaser. Further, the Purchaser warrants that he has determined and acquired any and all safety devices required for equipment sold by the Company. Weather covers and guards for motor and V-belt drives, couplings, shafts and bearings, along with inlet and outlet screens, are optional accessories noted in the price list.

These instructions cover the usual installation, operation and maintenance methods for which the product(s) was designed. They do not purport to cover all details or variations in the product(s) nor to provide for every possible contingency that might be met in connection with the installation, operation and maintenance. For any departures from these instructions, or should particular problems arise which are not covered sufficiently for the purchaser's purpose, the matter should be referred to the Company.

WARNING The Company products are designed and manufactured to provide reliable performance but they are not guaranteed to be 100% free of defects. Even reliable products will experience occasional failures and this possibility should be recognized by the User. If these products are used in a life support ventilation system where failure could result in loss or injury, the User should provide adequate back-up ventilation, supplementary natural ventilation or failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

WARNING DO NOT use in HAZARDOUS ENVIRONMENTS where fan's electrical system could provide ignition to combustible or flammable materials unless unit is specifically built for hazardous environments.

CAUTION Guards must be installed when fan is within reach of personnel or within seven (7) feet (2.134 m) of working level or when deemed advisable for safety.

DISCLAIMER The Company has made a diligent effort to illustrate and describe the products in this literature accurately; however, such illustrations and descriptions are for the sole purpose of identification, and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustrations or descriptions or dimensions.

LIMITED WARRANTY

WARRANTY AND DISCLAIMER: The Company extends this limited warranty to the original buyer and warrants that products manufactured by the Company shall be free from original defects in workmanship and materials for two years from date of shipment, unless otherwise noted (see specific product literature), provided same have been properly stored, installed, serviced, maintained and operated. This warranty shall not apply to products which have been altered or repaired without the Company's express authorization, or altered or repaired in any way so as, in the Company's judgment, to affect its performance or reliability, nor which have been improperly installed or subjected to misuse, negligence, or accident, or incorrectly used in combination with other substances. The Buyer assumes all risks and liability for results of use of the products. Warranties on purchased parts, such as but not limited to bearings, sheaves, belts, couplings, electric motors, pumps and controls are limited to the terms of warranty extended by our supplier.

Polyethylene tubing and cooling pads are warranted to be free of defects in material and workmanship for a period of 90 days from date of shipment and a like warranty applies to the cross fluted cellular type cooling cells for a period of two years from date of shipment provided same have been properly handled, stored, installed, serviced, maintained and operated. And further, not subjected to excessive heat, corrosive agents or chemicals, or mechanical abuse that may cause tearing, crushing or undue deterioration nor used on a system or in a manner other than that for which it was designed as explained in the product literature.

LIMITATION OF REMEDY AND DAMAGES: All claims under this warranty must be made in writing and delivered to P. O. Box 978, Muskogee, Oklahoma, 74402, within 15 days after discovery of the defect and prior to the expiration of the warranty period from the date of ship-

ment by the Company of the product claimed defective, and Buyer shall be barred from any remedy if Buyer fails to make such claim within such period.

Within 30 days after receipt of a timely claim, the Company shall have the option either to inspect the product while in Buyer's possession or to request Buyer to return the product to the Company at Buyer's expense for inspection by the Company. The Company shall replace, or at its option repair, free of charge, any product it determines to be defective, and it shall ship the repaired or replacement product to Buyer F.O.B. point of shipment; provided, however, if circumstances are such as in the Company's judgment to prohibit repair or replacement to remedy the warranted defects, the Buyer's sole and exclusive remedy shall be a refund to the Buyer of any part of the invoice price, paid to the Company, for the defective product or part.

The Company is not responsible for the cost of removal of the defective product or part, damages due to removal, or any expenses incurred in shipping the product or part to or from the Company's plant, or the installation of the repaired or replaced product or part.

Implied warranties, when applicable, shall commence upon the same date as the express warranty provided above, and shall, except for warranties of title, extend only for the duration of the express warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. The only remedy provided to you under an applicable implied warranty and the express warranty shall be the remedy provided under the express warranty, subject to the terms and conditions contained therein. The Company shall not be liable for incidental and consequential losses and damages under the express warranty, any applicable implied warranty, or claims for negligence, except to the extent that this limitation is found to be unenforceable un-

der applicable state law. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

No employee, agent, dealer, or other person is authorized to give any warranties on behalf of the Company or to assume for the Company any other liability in connection with any of its products except in writing and signed by an officer of the Company.

REPLACEMENT PARTS If replacement parts are ordered, buyer warrants that the original components in which these replacement parts will be placed are in satisfactory working condition, and when said replacement parts are installed, the resultant installation will operate in a safe manner, at speeds and temperatures for which the original equipment was purchased.

TECHNICAL ADVICE AND RECOMMENDATIONS, DISCLAIMER: Notwithstanding any past practice or dealings or any custom of the trade, sales shall not include the furnishing of technical advice or assistance or system design. Any such assistance shall be at the Company's sole option and may be subject to additional charge.

The Company assumes no obligation or liability on account of any recommendations, opinions or advice as to the choice, installation or use of products. Any such recommendations, opinions or advice are given and shall be accepted at your own risk and shall not constitute any warranty or guarantee of such products or their performance.

GENERAL In no event shall any claim for consequential damages be made by either party. The Company will comply with all applicable Federal, State, and local laws.