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FORM 610032

INSTALLATION & MAINTENANCE INSTRUCTIONS

CENTRI MASTER® FORWARD CURVE BLOWER

MODELS FCE, FCD, FCF, FCA, FCH, FCJ

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 fan orifice.

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 his own decision as to 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, or 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 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 to indoor storage. 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 wheels or propellers by hand to distribute bearing grease over the entire bearing surfaces.

Store at least 3 1/2" 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 wheels and propellers 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:

- Date
- Inspector's Name
- Name of Fan
- Location
- Condition of Paint or Coating
- Is moisture present?
- Is dirt accumulated?
- Corrective steps taken?

If moisture or dirt accumulations are found on parts, the source should be located and eliminated. Fans 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

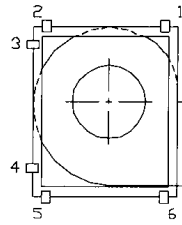
As fans are removed from storage to be installed in their final location, they should be protected and maintained in similar fashion, until the fan equipment goes into operation.

INSTALLATION

- CAUTION!** This unit has rotating parts and safety precautions should be exercised during installation, operation and maintenance.
- 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.
- MOUNTING** The fan should be mounted on a solid foundation equipped with anchoring devices (such as anchor bolts). Level the fan on the foundation, shimming where necessary. Anchor the fan securely to the foundation. If vibration isolators are used, these should be installed between the fan and the foundation. When mounted on suspended platforms, adequate cross bracing will be required. Flexible connections at the inlet and/or outlet are recommended.
- BELT DRIVES** Check pulley alignment and belt tension. Belt should deflect .50" (13 mm) to .75" (19 mm) when depressed by hand midway between pulleys. A belt should be just tight enough to avoid slippage. When the motor and drives are received mounted to the (FCF) fan, the RPM has been set to meet the specified performance. Motor positions for the FCD, FCH and FCJ blowers are defined in Figure 1.

For fans shipped without motors and drives mounted, the RPM is set by the installer as specified. Pulley combinations and belt lengths are included with each blower.

Motor Mounting Positions Models FCD, FCH, FCJ



When the drawing is turned to the desired discharge position, the motor position becomes apparent.

Example:

- | | | |
|-------------------|---|------------------------|
| Bottom Horizontal | - | Position 1, 2 and 3 |
| Top Horizontal | - | Position 4, 5 and 6 |
| Downblast | - | Position 2, 3, 4 and 5 |
| Upblast | - | Position 1 and 6 |

Figure 1

- CAUTION!** Before proceeding, make sure electrical service to fan is locked in "OFF" position. All wiring should be in accordance with local ordinances and the National Electric Code.
 - Check voltage at the fan to assure it corresponds with motor nameplate; high or low voltage can seriously damage the motor. Extra care should be taken when wiring two speed motors to assure proper motor lead groupings are used since improper connections WILL damage motors and void motor warranty.
 - Apply power momentarily to check impeller rotation with directional arrow. In the case of three phase motors, the direction can be reversed by interchanging any two of the three motor leads. For single phase motors, the reversing instructions appear on the wiring diagram located on the motor. **WARNING!** Operation in the wrong direction will deliver a reduced amount of air.
- OUTDOORS** FCF units are provided with standard Weather Covers (Arr. 10). Outlet shutters attached to the fan discharge should be normally closed when the fan is not running.
- BELT GUARDS** (Weather covers also serve as belt guards) must be installed when fan is within reach of personnel or located within 7 feet (2.134 m) of working level or when deemed advisable for safety.
- INLET, OUTLET GUARDS** (Available from Acme as optional equipment) must be installed whenever the fan is installed without ducts attached to the fan inlet and/or outlet and is within seven (7) feet (2.134 m) of working level or when deemed advisable for safety.
- DISCHARGE POSITION ROTATION - FCF SERIES** (ARR. 10) Remove motor enclosure cabinet cover and lay unit down on intake collar. (Figure 2)

Remove 8 bolts and rotate motor compartment to desired position (Figure 3) and replace 8 bolts in new position. FCF housing is rotatable in 45° increments. The FCA and FCE housing is rotatable in 90° increments by changing the location of the feet.

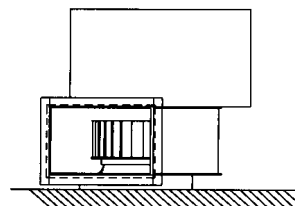


Figure 2

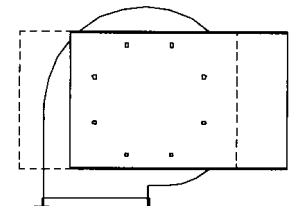


Figure 3

10. **WARNING!** Do not operate at a static pressure below that specified. This unit is designed to operate at a specific static pressure. If operated at a static pressure below that specified, motor overloading and burn-out will result. **Characteristics of wheel require high brake horsepower at low static pressure!** If the static pressure is actually less than the designed pressure, the motor will be operating at a higher BHP. Using an ammeter, measure the amperes actually being drawn by the fan motor WITH the duct in place. If the amp draw is greater than the service factor amperes, reduce the fan RPM by opening the variable speed drive on the motor shaft. Check the current again and repeat if necessary.

MAINTENANCE

1. **CAUTION!** Before proceeding, make sure the electrical service to the fan is locked in "OFF" position.
2. **REGULAR MAINTENANCE** A regularly scheduled inspection of all fan parts based on the condition of the air passing through the fan establishes a good maintenance routine. When the air is clean, maintenance can be as infrequent as once a year. When air is contaminated, maintenance may be required as often as once a month. Regular maintenance should include inspection and cleaning of all fan parts.
3. **BELT DRIVES** Check belt tension after first 48 hours of operation and thereafter annually. If belts show wear, they should be replaced. For 2 belt drives, be sure to replace both belts with a matched set. Do not adjust belts too tightly as this will cause undue wear on the bearings of both fan and motor. Motor pulleys should be inspected regularly and replaced if they show evidence of excessive wear or "grooving".

WARNING! Do not operate at higher speeds than rated in catalog. Do not replace motor pulley with one having larger diameter or fan pulley with one of smaller diameter.

4. **LUBRICATION** .75" (19 mm) and 1.00" (25 mm) ball bearings are permanently lubricated. 1.19" (30 mm) and larger bearings are lubricatable. **DO NOT OVER LUBRICATE.** Caution should be used when greasing with a high pressure gun which can blow bearing seals and overfill the bearing with grease. This condition can result in excessive overheating of the bearing and eventual failure. If impeller shaft bearings need replacement, replace with bearings comparable to original equipment. To insure correct spacing of new bearings, measure the distance between old bearings and distance between bearings and end of shaft.

IMPORTANT: All bearings are of the locking collar type. The collar must first be positioned against inner race on inboard bearing and turned in direction of impeller rotation with drift pin and hammer until it locks. Locking collars must be on inboard (facing) sides of the bearings. Secure bearing to shaft with set screw. Lock and secure other bearing to shaft in same manner.

If pillow block type bearings are used, slide bearings onto shaft to desired location and bolt bearing block securely to support base.

Slide shaft back and forth in secured bearing (do not drive with hammer) and rotate to make certain it turns freely. Secure bearings to shaft by tightening set screws.

5. **MOTORS** Most motors are pre-lubricated and do not require additional lubrication. Grease fittings on the motor indicate the exception and these should be greased in accordance with printed instructions on the motor.

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.

TERMS AND CONDITIONS

DESIGN CHANGES Acme 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 Acme 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: Acme Engineering and Manufacturing Corporation extends this limited warranty to the original buyer and warrants that products supplied by the Company, shall be free from original defects in workmanship and materials for two years from date of shipment (except for the warranty periods noted for products in the paragraph immediately following), provided same have been properly handled, 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. Evaporative cooling pads are warranted to be free of defects in materials and workmanship 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. The Buyer assumes all risks and liability for results of use of all products.

Acme's exclusive duplex split pillow block bearings and shaft are warranted to be free of defects in materials and workmanship for a period of five years from date of shipment. Belts are warranted to be free of defects in materials and workmanship for a period of one year from date of shipment. Polyethylene tubing is warranted to be free of defects in materials and workman-

ship for a period of 90 days from date of shipment.

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 two years from the date of shipment 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 under 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.



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