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INSTALLATION MAINTENANCE, OPERATING INSTRUCTIONS

IM-MV-8

SQUARE FANS

WORD ABOUT SAFETY

Beginning in June 2012, the above **WARNING** signage has been placed on all Mechanovent fans, as specified by ISO and recommended by the European Union. 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 Mechanovent 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 prevent entry and discharge of solid objects.

Danger: Do Not Enter/Confined Space

ACCESS DOORS

The above DANGER decal is placed on all Mechanovent cleanout doors. These doors, as well as access doors to the duct system, should never be opened while the fan is in operation. Serious injury could result from the effects of air pressure or suction.

Quick-opening doors must have the door handle bolts securely tightened to prevent accidental or unauthorized opening. Bolted doors must be tightened for the same reason.

RECEIVING AND INSPECTION

The fan and accessories should be inspected on receipt for any shipping damage. Turn the wheel by hand to see that it rotates freely and does not bind. If dampers or 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. Mechanovent will assist the customer as much as possible; however, claims must be originated at the point of delivery.

HANDLING AND STORAGE

Holes are provided in the housing sides for lifting. Never lift a fan by the wheel, shaft, motor, motor bracket, 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. Cover the entire fan to prevent the accumulation of dirt and moisture in the housing. Cover motors with waterproof material. Check dampers for free operation and lubricate moving parts prior to storage. Inspect the stored unit periodically. **Rotate the wheel by hand every two weeks to redistribute grease on motor bearings.**

FAN INSTALLATION

Mechanovent wheels are dynamically balanced when fabricated. Fully assembled fans are test run at operating speeds to check the entire assembly for conformance to Mechanovent vibration limits. Nevertheless, all units must be adequately supported for smooth operation. **Ductwork or stacks should be independently supported as excess weight may distort the fan housing and cause contact between moving parts.** Where vibration isolators are used, consult the Mechanovent certified drawing for proper location and adjustment.

Slab-Mounted Units

A correctly designed and level concrete foundation provides the best means of installing floor-mounted fans. The mass of the base must maintain the fan/driver alignment, absorb normal vibration, and resist lateral loads. The overall dimensions of the concrete base should extend at least six inches beyond the base of the fan. The weight of the slab should be two to three times the weight of the rotating assembly, including the motor. The foundation requires firmly anchored fasteners such as the anchor bolts shown in Figure 1. Hammer-drilled expansion fasteners can be used in less demanding applications.

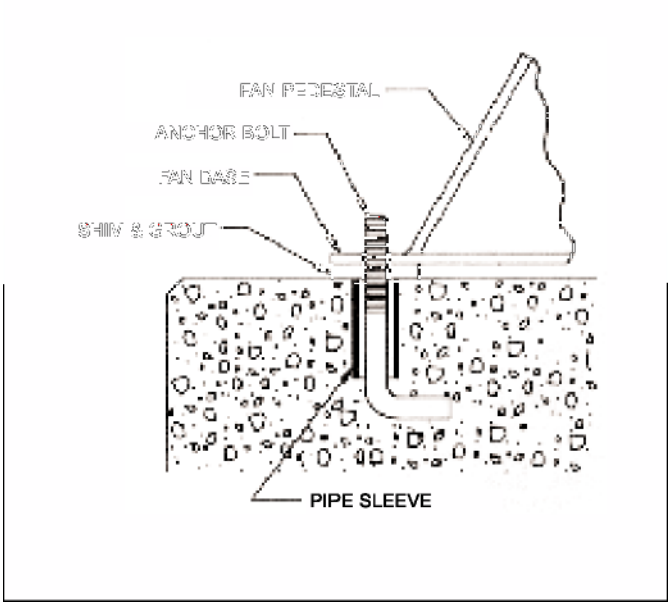


Figure 1

Move the fan to the mounting location and lower it over the anchor bolts, leveling the fan with shims around the bolts. Fasten the fan securely. When grout is used, shim the fan at least 3/4-inch from the concrete base (see Figure 1). When isolation is used, check the Mechanovent certified drawing for installation instructions.

Elevated Units

When an elevated or suspended structural steel platform is used, it must have sufficient bracing to support the unit load and prevent side sway. The platform should be of welded construction to maintain permanent alignment of all members.

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 wheel design. Do not under any circumstances exceed the maximum safe fan speed published in the Mechanovent bulletin, which is available from your Mechanovent field sales representative.

Procedure

1. If the drive components are not supplied by Mechanovent**,** 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. Check the interior of the fan as well. Turn the wheel by hand to check for binding.

3. Check drive installation.

4. Check the tightness of all setscrews, nuts and bolts. When furnished, tighten hub setscrews with the wheel oriented so 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 wheel rotation.

6. Use extreme caution when testing the fan with plenum ducting disconnected. Apply power and check for unusual sounds or excessive vibration. If either exists, see the section on Common Fan Problems. To avoid motor overload, do not run the fan for more than a few seconds if plenum is not fully installed. Without plenum ductwork, normal operating speed may not be obtained without motor overload. Once plenum ductwork is complete, check for correct fan speed and complete installation. Plenum ductwork and guards must be fully installed for safety.

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

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

Table 1 - WHEEL SETSCREW TORQUES

Setscrew Size 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	396	33
1/2	600	50
5/8	1164	97

*** Stainless Steel setscrews are not hardened and should not be tightened to more than 1/2 the values shown.**

FAN MAINTENANCE

Mechanovent 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 wheel for any wear or corrosion, as either can cause catastrophic failures. Check also for the build-up of material which can cause unbalance resulting in vibration and serious safety hazards. Clean or replace the wheel as required.
2. During any routine maintenance, all setscrews and bolts should be checked for tightness. See table for torques.
3. When installing a new wheel or cone, the proper wheel-to-inlet cone clearance must be maintained (see Figure 2).

WARNING: Do not remove or loosen the fan hub from the fan wheel. Removing or loosening the fan hub from the fan wheel will cause imbalance and void the warranty.

FULL-WIDTH WHEEL-CONE CLEARANCES
(contact Mechanovent for partial-width dimensions)

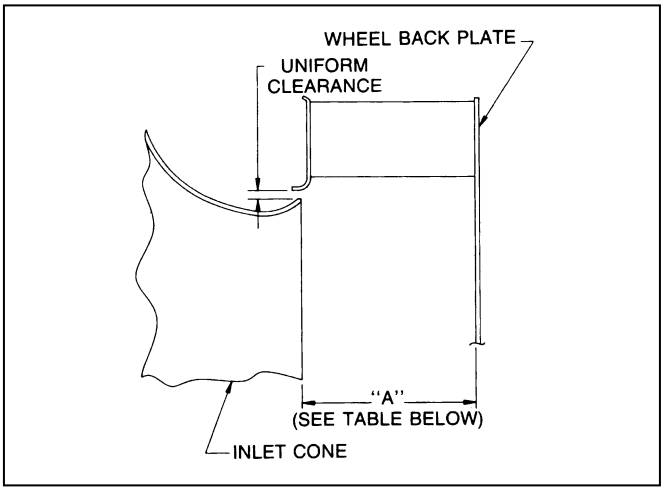


Figure 2

Fan Model	"A" Dimension	Fan Model	"A" Dimension
10	4 1/2	20	7 5/16
12	5	22	8 1/8
13	5 1/2	24	8 7/8
15	6 7/16	27	9 7/8
16	6	30	10 11/16
18	6 5/8		

WHEEL BALANCE

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

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 wheel that is considered structurally sound.

Balance weights should be rigidly attached at a point that will not interfere with the housing nor disrupt airflow. Remember that centrifugal forces can be extremely high at the outer radius of a fan wheel. Welding is the preferred method of balance weight attachment. Be sure to ground the welder directly to the fan wheel.

COMMON FAN PROBLEMS

Excessive Vibration

A common complaint regarding industrial fans is “excessive vibration”. Mechanovent 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 or setscrews.
2. Misaligned or unbalanced motor.
3. Bent shaft due to mishandling or material impact.
4. Accumulation of foreign material on the wheel.
5. Excessive wear or erosion of the wheel.
6. Excessive system pressure or restriction of airflow due to closed dampers.
7. Inadequate structural support, mounting procedures or materials.
8. Externally transmitted vibration.

Inadequate Performance

1. Incorrect testing procedures or calculations.
2. Fan running too slowly.
3. Fan wheel rotating in wrong direction.
4. Wheel not properly centered relative to inlet cone.
5. Poor system design, closed dampers, air leaks, clogged filters, or coils.
6. Obstructions or sharp elbows near inlets.
7. Sharp deflection of airstream at fan 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.

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.
5. Excessive fan speed.
6. Extreme ambient or airstream temperatures.
7. Improper tightening of wheel setscrews.

REPLACEMENT PARTS

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

When ordering replacement parts, specify the part name, Mechanovent shop and control number, fan size, type, rotation (viewed from drive end) and arrangement. Most of this information is on the metal nameplate attached to the fan base.

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

Example: Part required: AcF Wheel
Shop/control number: A-10106-100
Fan description: Model 18 SQ Fan
Clockwise rotation
Arrangement: 4

Suggested replacement parts include:

Wheel	Component parts: Damper
Inlet Cone	Motor

LIMITED PRODUCT WARRANTY

All products are warranted by Mechanovent 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 Mechanovent that the product was properly installed and maintained in accordance with Mechanovent's instructions and recommendations and that it was used under normal operating conditions.

This warranty is limited to the replacing and/or repairing by Mechanovent of any part or parts which have been returned to Mechanovent with Mechanovent's written authorization and which in Mechanovent's opinion are defective. Parts not manufactured by Mechanovent but installed by Mechanovent 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. Mechanovent shall have the sole right to determine whether defective parts shall be repaired or replaced.

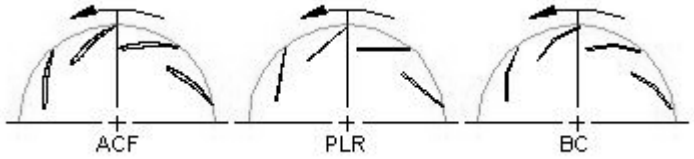
This warranty does not cover any customer labor charges for replacement of parts, adjustments or repairs, or any other work unless such charges shall be assumed or authorized in advance, in writing, by Mechanovent**.**

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

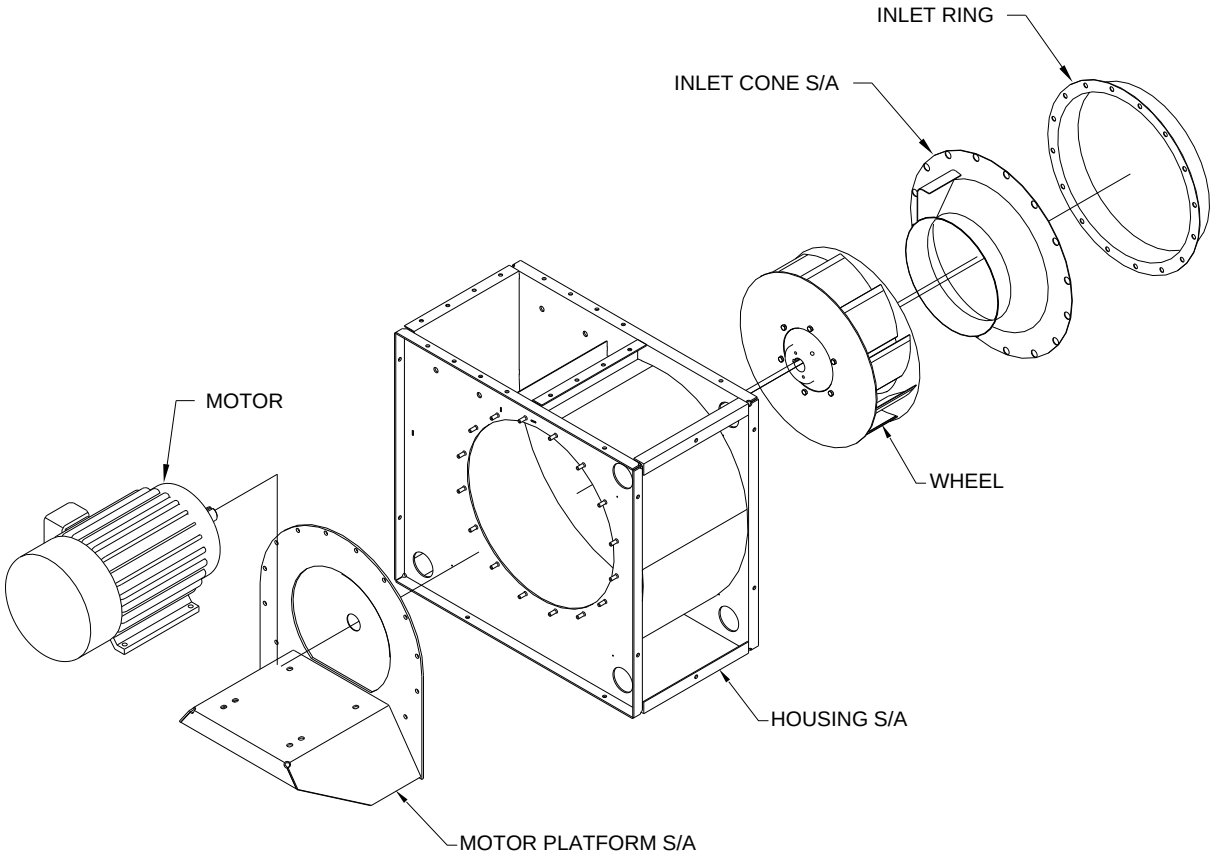
This warranty shall be null and void if any part not manufactured or supplied by Mechanovent for use in any of its products shall have been substituted and used in place of a part manufactured or supplied by Mechanovent for such use.

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 Mechanovent's liability for loss from any cause whatsoever, shall be the purchase price of the goods sold hereunder for which a claim is made.

SPECIFY ROTATION AS VIEWED FROM DRIVE SIDE



ARROW INDICATES COUNTERCLOCKWISE ROTATION



Parts List	
1. Inlet Ring	4. Housing
2. Inlet Cone	5. Motor Platform
3. Wheel	6. Motor

* Order for parts must specify rotation.

Form 113 MJN