

## CA PLENUM 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 Mechanovent Corporation, 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.

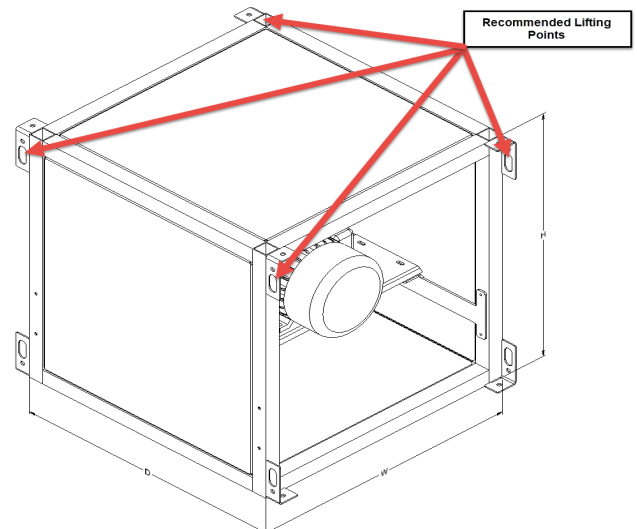
### AIR PRESSURE AND SUCTION

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.

### HANDLING AND STORAGE

Fans should be lifted by the base, mounting supports, or lifting eyes only. 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 entire fan to prevent accumulation of dirt and moisture in the housing. Cover motors with waterproof material. Inspect the stored unit periodically. **Rotate the wheel by hand every two weeks to redistribute grease on internal bearing parts.**



## RECEIVING AND INSPECTION

The fan and accessories should be inspected on receipt for any shipping damage. Turn 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.

## FAN INSTALLATION

nyb 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 cube and cause contact between moving parts.** Where vibration isolators are used, consult the Mechanovent certified drawing for proper location and adjustment.

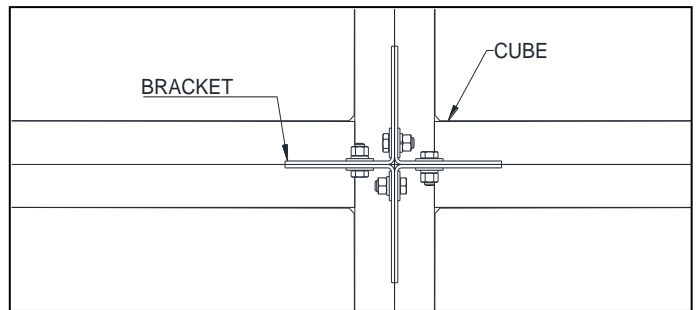
Mechanovent fans are designed for smooth operation throughout the cataloged speed range. Vibration levels are dependent upon the rigidity of the support structure on which the fan is mounted. CA Plenum Fan base should be bolted to the main supporting structurals of the particular system. The CA Plenum Fan lifting eyes/mounting bracket is also provided with predrilled holes. These holes are large enough to allow alignment at the time of installation yet still accept a large enough mounting bolt or stud to ensure ample security. All of the mounting holes should be used. By doing so, the entire machine provides the mass and rigidity necessary to ensure smooth operation.

## INSTALLATION: CA PLENUM FAN

1. Remove CA Plenum Fans from all packaging.
2. Mount the fan or fans onto mounting structure using lifting points on fan. See illustration. Do not lift more than one fan at a time.
3. Secure the fan to the mounting structure and other CA Plenum Fans. Be certain to secure the first (bottom) layer of fans before proceeding with adding the second layer of fans.
4. Refer to the table/illustration showing max stack Cube Fans. Cubes cannot exceed max number of stacked fans.
5. Caulking and/or a thin layer of neoprene gasketing between fans to prevent noise as a result of air is recommended.
6. If fan is taken out of service, discharge side should be blocked off to prevent air circulation back through the idle fan.

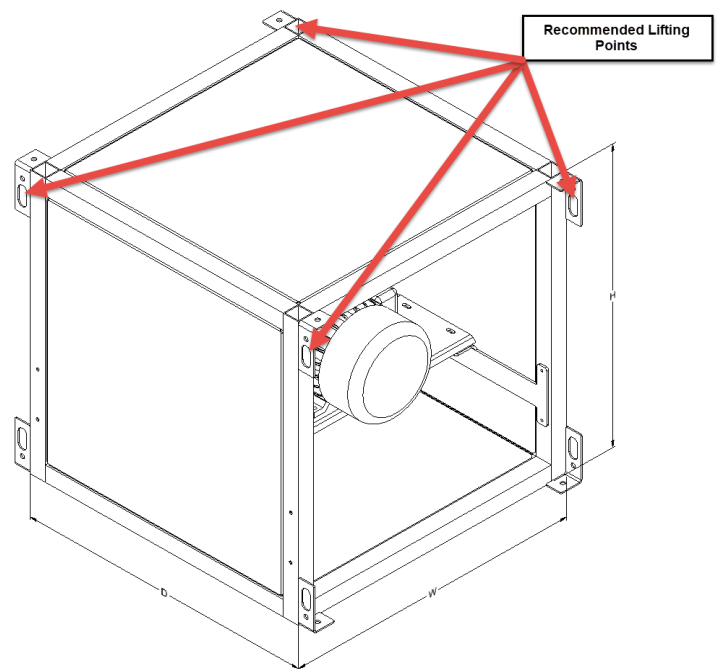


## ARRAY MOUNTING INSTRUCTIONS



Mounting Hardware All Installation		
ITEM	QUANTITY REQUIRED	
	DOUBLE CUBE	QUAD CUBE
1/2-13 x 1-1/4" Hex Head Cap Screws	4	16
1/2" Flat Washers	8	32
1/2" Lock Washers	4	16
1/2" Hex Nuts	4	16

**Note:** Hardware to be supplied by end user.



Size	W	H	D*	Weight **	Max Stack ^
13	29	29	27	150	4
15	33	33	31	195	4
16	35	35	35	230	4
18	37	37	37	255	3
20	39	39	39	290	3
22	43	43	43	335	3

\* D dimension does not include optional backdraft damper and standoff or cube mounting brackets.

\*\* Weight does not include motor but does include backdraft damper and standoff at max motor frame size.

^ Maximum number of cubes that can be stacked.

## 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.

### Procedure

1. 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. Check the tightness of all setscrews, nuts and bolts. Tighten hub setscrews with the wheel oriented so that the setscrew is positioned underneath the shaft.
2. 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.
3. 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 ductwork is not fully installed. Without plenum ductwork, normal operating speed may not be obtained without motor over-load. Once plenum ductwork is complete, check for correct fan speed and complete installation. Plenum ductwork and guards must be fully installed for safety.
4. Setscrews should be rechecked after a few minutes, eight hours and two weeks of operation (see Tables 1 & 2 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
3/4	2016	168
7/8	3204	267
1	4800	400

## 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, motor bearing wear and serious safety hazards. Clean or replace the wheel as required.
2. Check Backdraft Dampers to ensure vanes are moving freely.
3. During any routine maintenance, all setscrews and bolts should be checked for tightness. See tables for torques.
4. When installing a new wheel or cone, the proper wheel-to-inlet cone clearance must be maintained (see Figure 3).

**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.**

### CUBE ARRAY PLENUM

#### WHEEL-CONE CLEARANCES

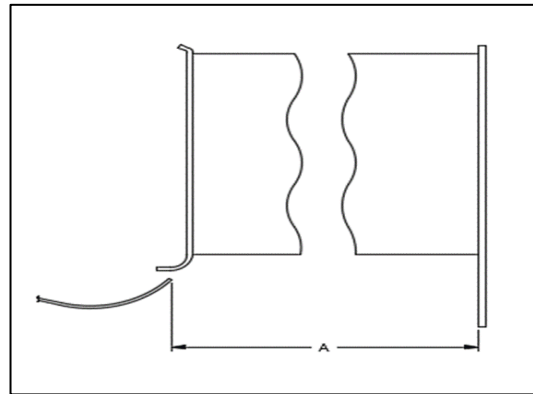


Figure 3

Fan Size	"A" Dimension
13	5
15	5 1/2
16	6 9/16
18	7 7/16
20	8 1/8
22	9

### WHEEL BALANCE

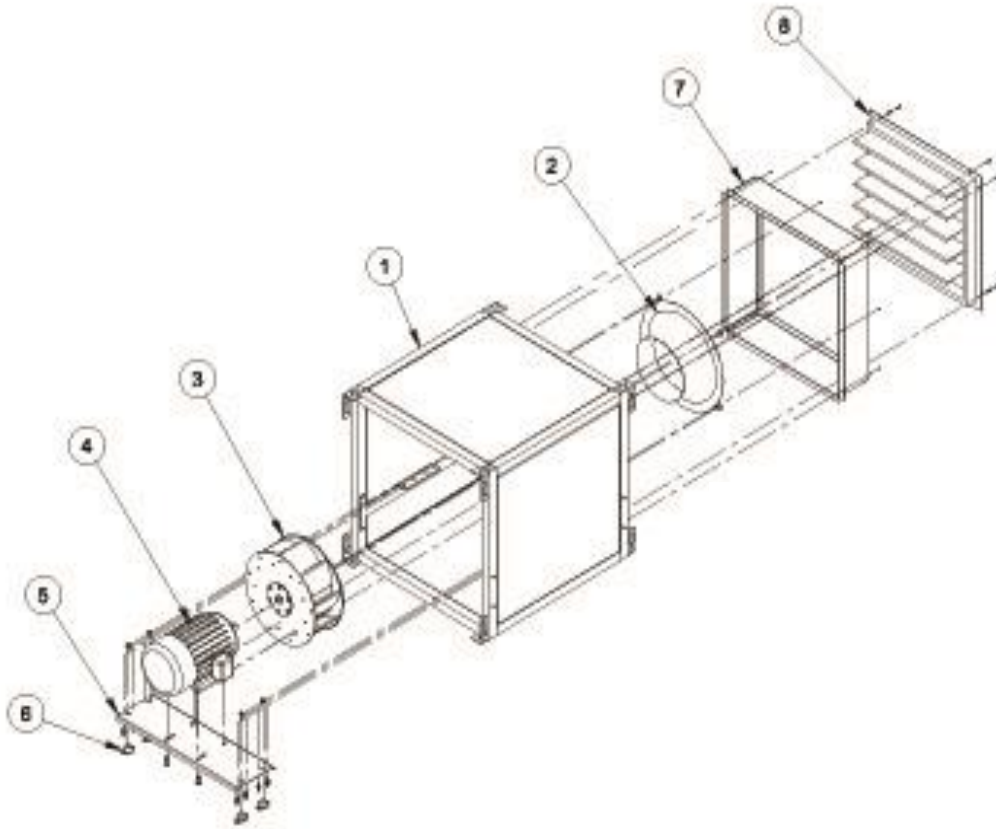
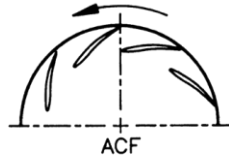
Airstreams containing particulate or chemicals can cause abrasion or corrosion of the fan parts. This wear is often uneven and can lead to significant wheel unbalance over time. When such wear is discovered, a decision must be made as to whether to rebalance or replace the wheel.

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. Otherwise, the welding current could pass through the motor bearings and damage the motor.



## CUBE ARRAY PLENUM FAN



### Parts List

- |               |                    |
|---------------|--------------------|
| 1. Cube       | 5. Motor Platform  |
| 2. Inlet Cone | 6. Isolation       |
| 3. Wheel      | 7. Damper Standoff |
| 4. Motor      | 8. Damper          |