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# NBCXM54

## GALVANIZED WALL FANS

### Installation, Operation, and Maintenance Instructions

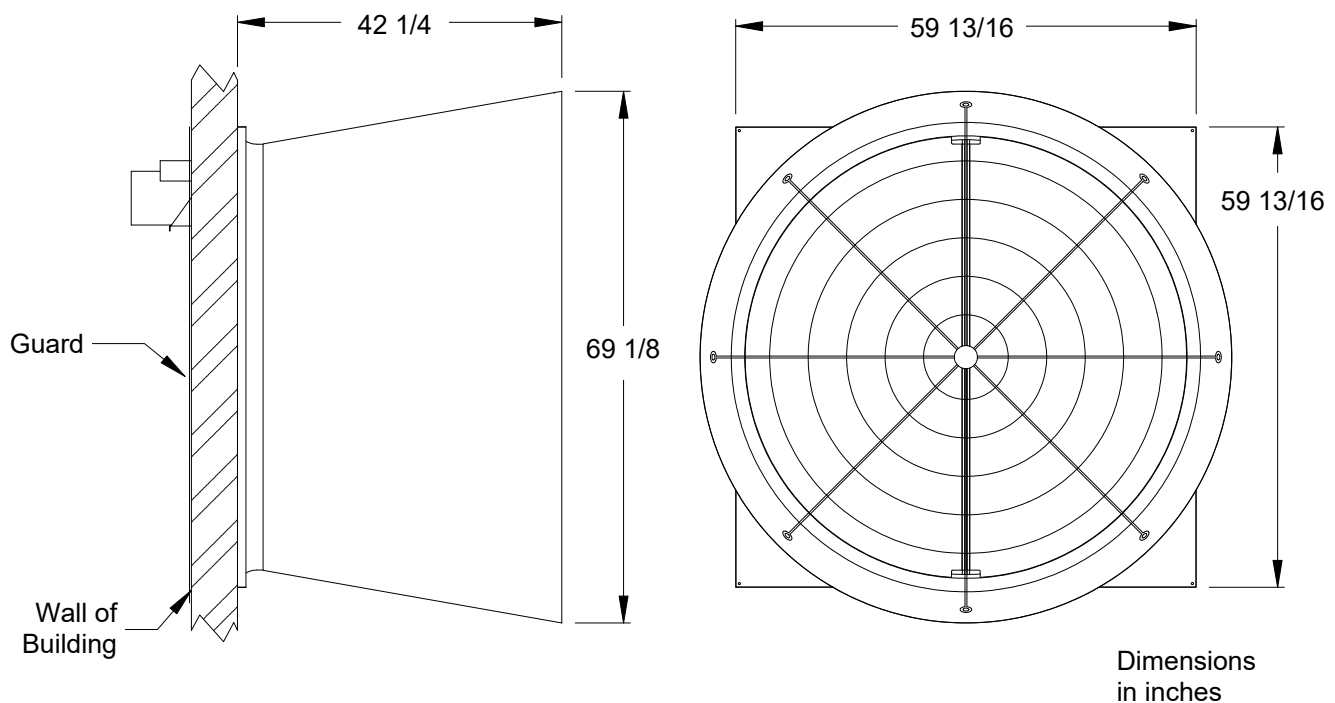


Figure 1

NBCXM54L \* NBCXM54M

### UNPACKING

Inspect the fan for signs of shipping damage. It is the responsibility of the customer to report any shipping damage to the freight carrier.

### WHAT SHOULD YOU FIND?

Fan, Damper Door Ring Assembly, Cone (4 cone panels and 4 cone gussets), Rear Guard, Front Cone Guard, and Hardware Package

# FRAMING

For optimum performance, both the Wall Opening and the Frame square Inside Dimension (ID) should be 58". However, the Wall Opening ID may be between 56 1/2" and 58" square. The Frame ID may also be between 56 1/2" and 58" square, but must be equal to or larger than the wall opening. See Figures 2 (for 2x4 frame construction) or 3 (for 4x4 post construction) below.

## FRAME CONSTRUCTION

Recommended Spacing is at least 16"; Minimum Spacing is 12"

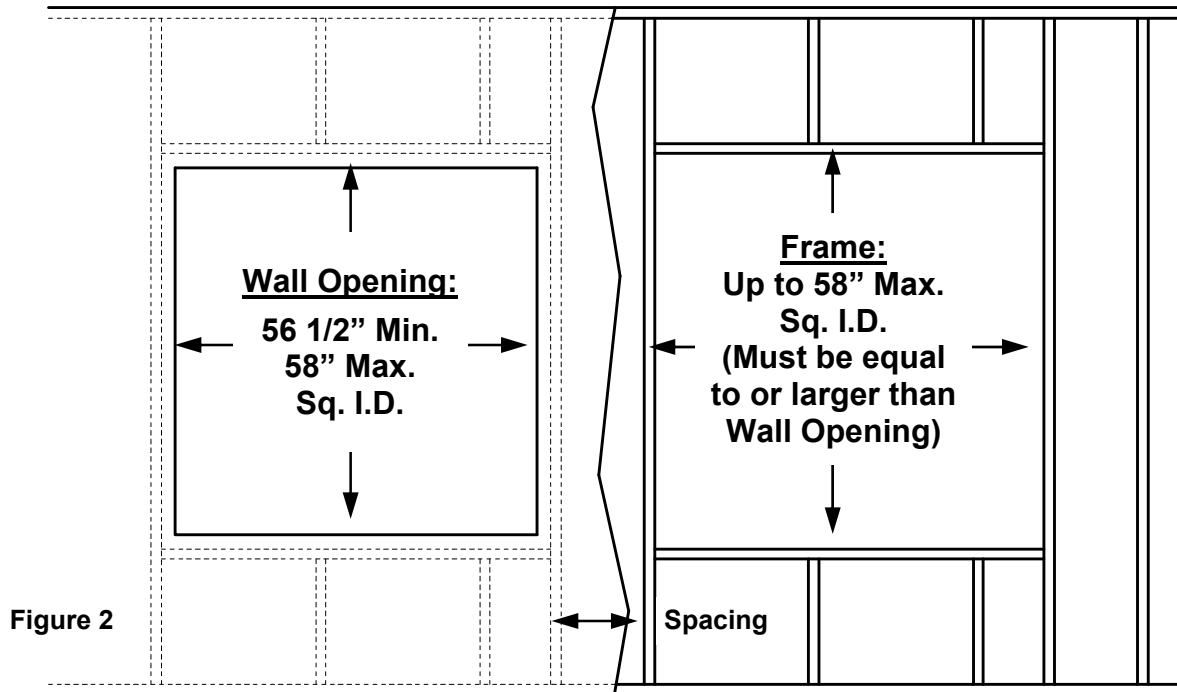


Figure 2

## POST CONSTRUCTION

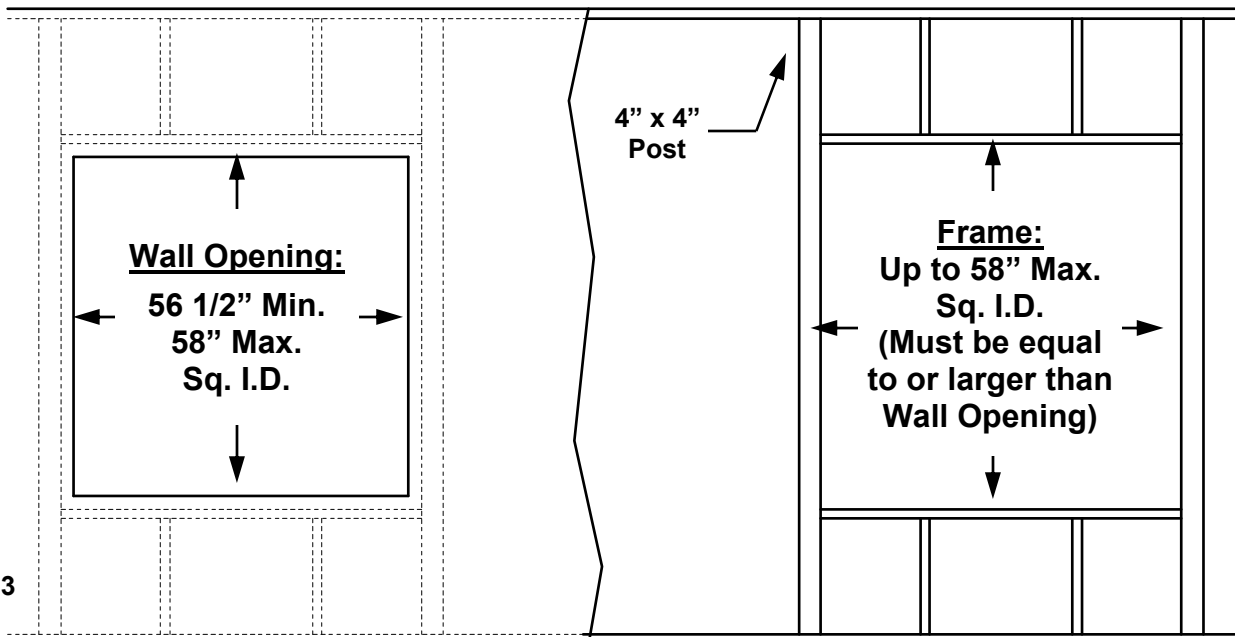


Figure 3

# FAN ASSEMBLY

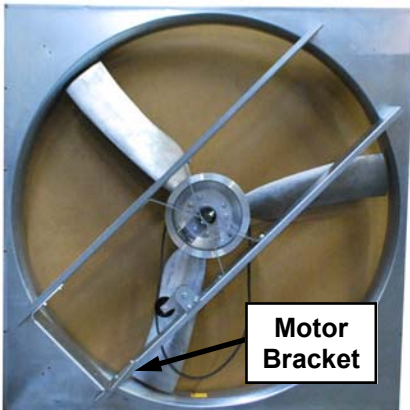
Before installation of fan, check carefully for shipping damage which may result in blade misalignment, deformed parts or other damage. After motor has been mounted, check pulley alignment and belt tension. (For details on pulley alignment, refer to *Page 10* in this booklet.) Before connecting the power source, check motor nameplate to be sure the correct phase and voltage will be applied. Single phase motors are shipped from the factory wired for 230 volt operation. For low voltage operation see motor manufacturer's instructions on nameplate. Make sure propeller turns freely without striking fan frame or any foreign object which may interfere with its operation. Note direction arrow on orifice to make sure propeller is rotating in the correct direction when power is applied.

As shown on *Page 4*, the fan may be assembled with the motor either below the fan shaft (Bottom Mount) or above the fan shaft (Top Mount). Before mounting the motor, determine whether Top Mount or Bottom Mount best suits your needs.

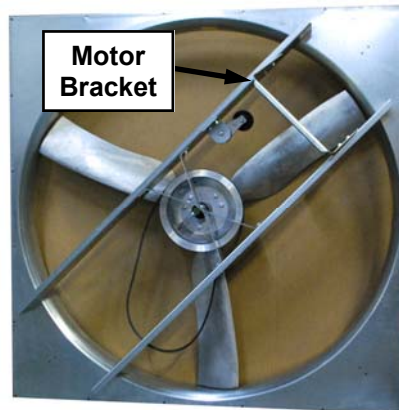
## Motor Mounting

The motor bracket must be rotated from its factory-mounted shipping position:

- ⇒ **Bottom Mount:** With the fan positioned such that the motor bracket is towards the lower left or lower right of the fan panel, remove the motor bracket from its shipping position and bolt it to the uprights as shown in Figure 4. Table 1 shows the upright mounting holes (counting up from the bottom of the upright) to use to mount the motor bracket.
  
- ⇒ **Top Mount:** With the fan positioned such that the motor bracket is towards the upper left or upper right of the fan panel, remove the motor bracket from its shipping position, and bolt it to the uprights as shown in Figure 5. Table 1 shows the upright mounting holes (counting down from the top of the upright) to use to mount the motor bracket.



**Figure 4 — Bottom Mount**



**Figure 5 — Top Mount**

Motor Power, Frequency	Bottom Mount	Top Mount
1 HP, 60 Hz	1 & 2	2 & 4
1 ½ HP, 60 Hz	1 & 3	3 & 4
1 HP, 50 Hz	1 & 3	3 & 4
1 ½ HP, 50 Hz	2 & 3	3 & 4

**Table 1 — Mtr. Bkt. Hole Locations**

Note: It may be necessary to slightly adjust the motor bracket in its slots to achieve proper belt tension.

Place the motor on the motor bracket and bolt it down using the hardware provided. Make sure the motor base remains flat against the motor bracket.

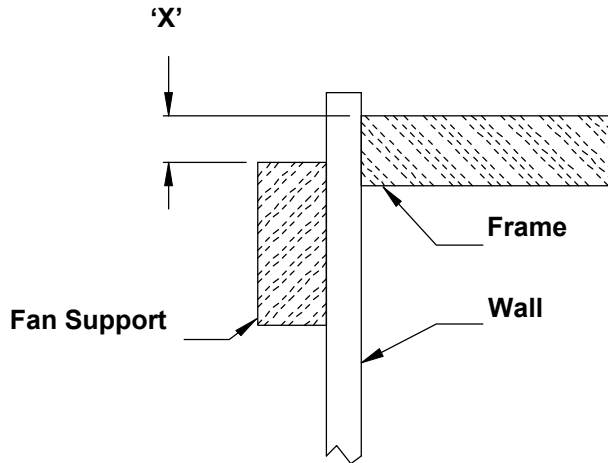
The motor pulley should be placed on the motor shaft with the “set screw” side of the pulley toward the motor. Using a long straight bar, check the alignment of the motor pulley, the belt tensioner sheave, and the fan hub pulley. If necessary, loosen the motor pulley set-screw and/or the motor mounting bolts and adjust as necessary. To align the belt tensioner, loosen the two tensioner bracket bolts and adjust the position of the tensioner. Re-tighten pulley set screw, motor mounting bolts, and the tensioner bracket bolts as necessary. **IMPORTANT:** Motor bracket bolts must be secured to maintain proper belt alignment and tension.

Once the motor has been properly mounted and the pulleys have been aligned, complete the assembly of the fan by threading the belt over the fan hub pulley groove, motor pulley, and belt tensioner. The factory mounted tensioner should be set for proper belt tension. If a tension adjustment becomes necessary, refer to *Page 9* in this booklet. Again, check for belt alignment using a straight bar as described above. Next, turn the blade assembly by hand to insure free rotation. The fan is now ready to be mounted onto the wall.

# FAN MOUNTING

## Fan Support

To help hold the fan in place for mounting, a support such as a 2x4 or angle iron (not supplied) should be fastened to the wall below the Wall Opening. This Fan Support should be located a small distance below the top of the lower Frame board such that the fan is centered over the wall opening when placed on the Fan Support. Refer to Figure 6 to determine the distance between the Frame and Fan Support based on the Frame ID (*not* Wall Opening).



Frame ID	'X'
58	7/8
57 3/4	1
57 1/2	1 1/8
57 1/4	1 1/4
57	1 3/8
56 3/4	1 1/2
56 1/2	1 5/8

Figure 6 — Cross-section of mounting wall

Once the location of the Fan Support has been determined, place a level on the Fan Support to insure that it is perfectly horizontal, and fasten it to the wall (fasteners not supplied) as shown in Figure 7.

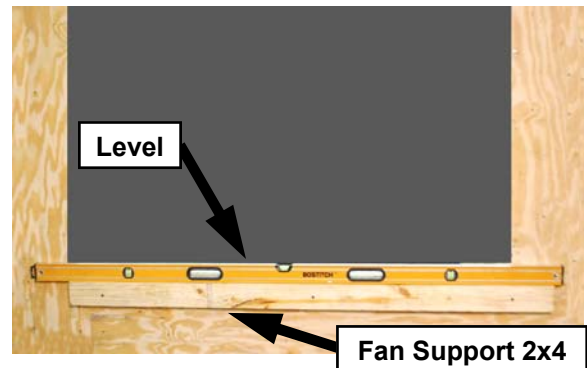


Figure 7

## Fan Mounting

With the Fan Support securely in place, lift the fan and place it on the Fan Support against the wall opening. Note that the entire fan may be rotated to locate the motor to the left or to the right of center as desired. See Figures 8 & 9 for possible configurations. Using the holes on the edge of the fan panel face, fasten the fan into wall (fasteners not supplied). Caulk the perimeter of the fan panel to seal it.



Bottom Mount



Top Mount

Figure 8 — Bottom Mount Configurations

Figure 9 — Top Mount Configurations

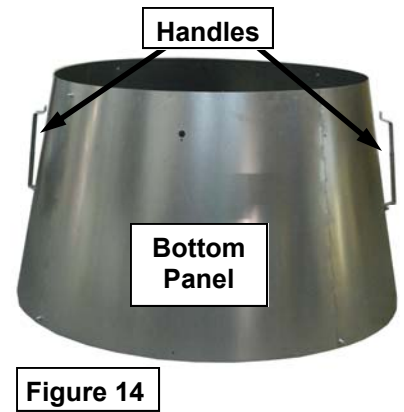
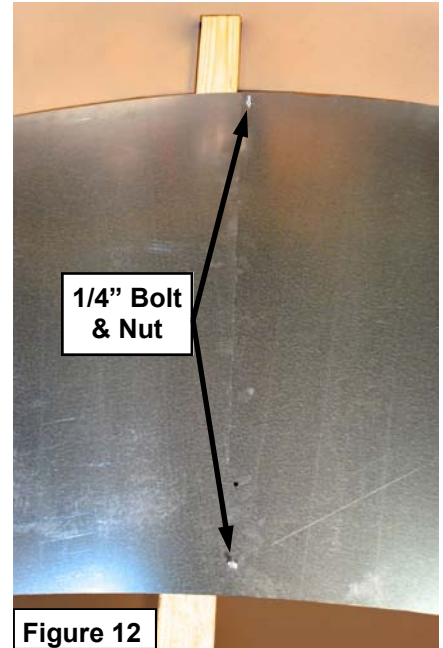
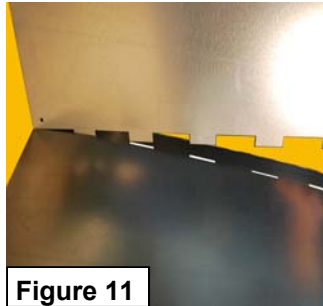
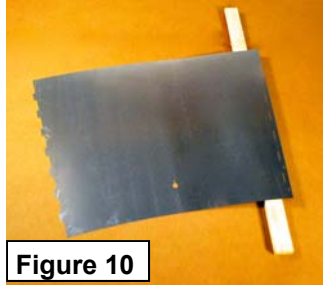
# CONE ASSEMBLY

The discharge cone consists of four cone quarter panels that are joined by an interlocking tab-and-slot design. The panels used for the top and sides of the cone are identical. The bottom cone panel has a 3/4" drain hole located in the middle of the panel towards the small diameter end.

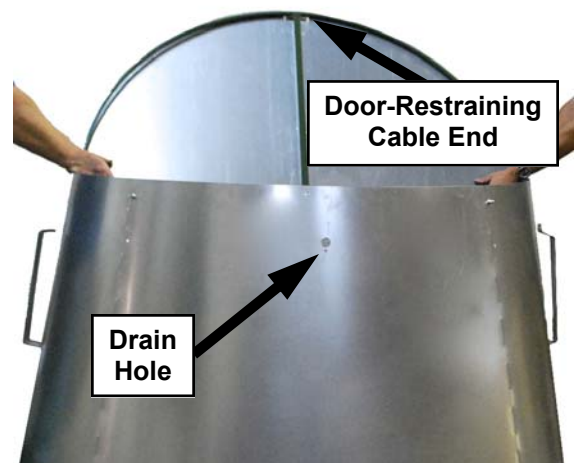
Begin construction by placing one panel on the ground. Slide a 2x4 under the slotted edge of the cone as shown in Figure 10. Next, aligning the tabs in a second panel with the slots of the first, join the two panels by inserting the tabs into the slots — see Figure 11. Fasten the two panels together using two 1/4" X 3/4" bolts *up through the bottom of the panels* and two 1/4" whiz-lock nuts in the end overlapping holes of the two panels, as shown in Figure 12. Repeat this process for the two remaining panels. The 4 panels in the flat is shown in Figure 13.

Now, the cone may be completed by fastening the fourth panel to the first panel. To do this, bring the edge of the fourth panel to the edge of the first and insert the tabs into the slots. Fasten the first and fourth panels using two 1/4" X 3/4" bolts and four 1/4" whiz-lock nuts in the end overlapping holes of the two panels. The cone should now be placed such that the larger diameter opening is on the ground as shown in Figure 14.

A Handle Mounting Hole is located near the center of the Side Panels. (The Side Panels are the two panels adjacent to the Bottom Panel, which contains the drain hole, as shown in Figure 14.) Once all four panels are fastened together, attach one end of a Handle to the Side Panel using a 1/4" X 3/4" bolt, through the Handle Mounting Hole of the Side Panel and then through one end of the Handle. Fasten with a 1/4" whiz-lock nut. Do not fasten the other side of the Handle at this time. Repeat this process with the other Handle on the other Side Panel.

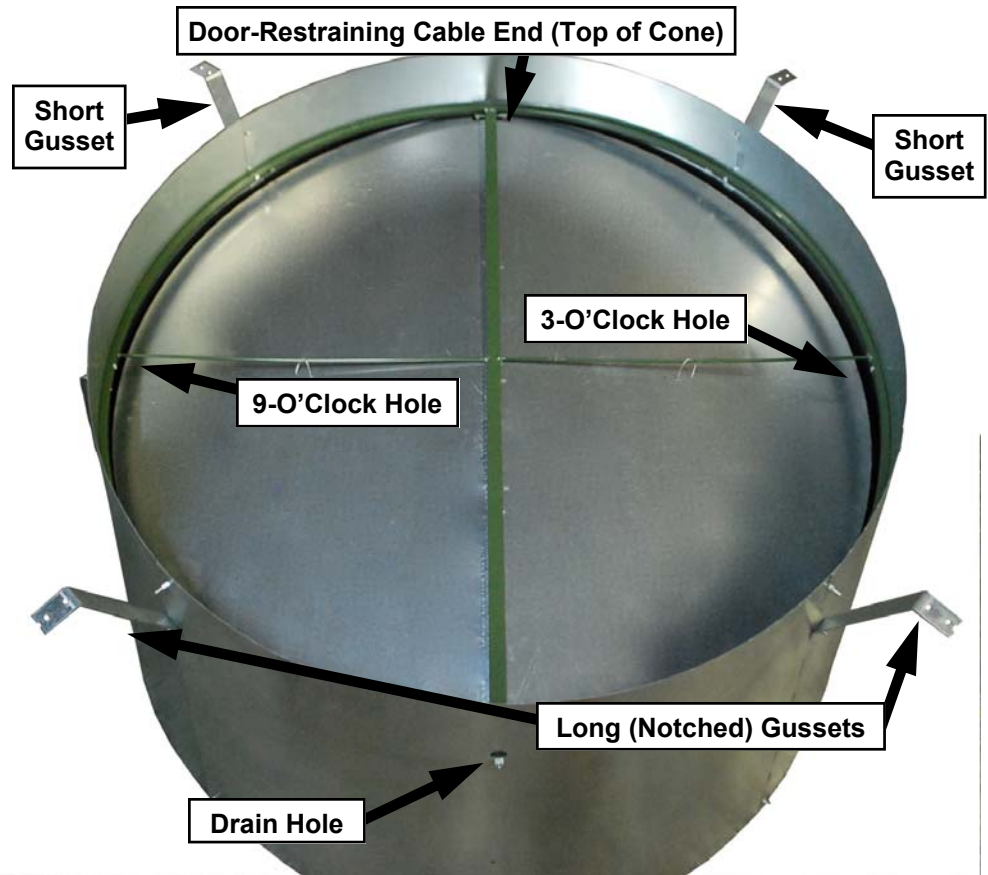


Next, the damper door ring assembly should be fastened to the cone. Note that the damper door ring assembly has a top — where the door-restraining cable is *permanently attached* — and a bottom (where the cable spring is held in place for shipment by a rubber band). Take the damper door ring assembly, *making sure the doors open downward*, and insert it at an angle into the cone as shown in Figure 15. The top end with the door-restraining cable permanently attached should be opposite the drain hole in the cone. Once the entire ring assembly has been placed inside the cone, level the ring and align the pre-drilled ring holes with the corresponding overlapping holes in the cone. From the inside of the assembly, place a 1/4" X 1-1/4" bolt through the holes in the 3-o'clock and 9-o'clock positions of the ring (locating the drain hole at the 6-o'clock position), through the Handles, and fasten with two 1/4" whiz-lock nuts. Continue fastening the door assembly to the cone using two 5/16" X 1/2" self-drilling screws: one adjacent to the drain hole (bottom), and one on the opposite side (top) of the cone. See Figure 16.



# CONE MOUNTING

After the ring has been secured, the cone gussets will be placed on the cone. NOTE: there are two sets of two gussets. The longer set will have a notch on the end with two holes. The longer set should be placed on either side of the cone drain hole (cone bottom). The shorter set of gussets should be placed opposite the drain hole (cone top). To attach a gusset, align the single hole in the gusset flange with the hole in the assembly ring and in the cone at the 45° angles. Push a 1/4" X 1-1/4" bolt through the assembly ring, through the cone, and through the gusset. Fasten the bolt with a 1/4" whiz-lock nut. Repeat this process for the three other gussets. Refer to Figure 16 for details. Caulk around the damper door ring to prevent light and wind blown rain water leakage.

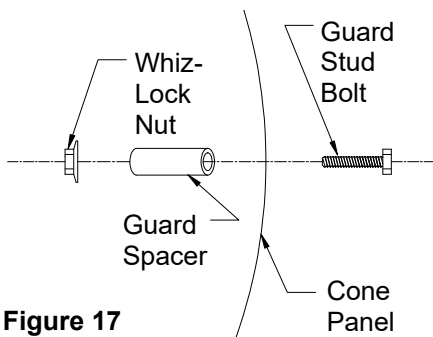


**Figure 16 — Damper Door Ring Assembled in Cone**

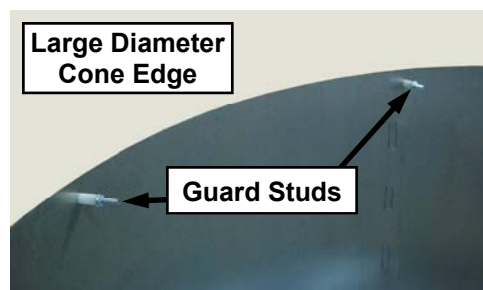
To mount the cone assembly, pick the assembly up by the handles and place the top of the smaller end over the fan panel orifice. Make sure that the drain hole in the cone is at the bottom. Fasten the top cone gussets to the fan panel using 1/4" X 1-1/4" bolts, 1/4" flat washers, and 1/4" whiz-lock nuts. Next, slide the rest of the cone over the orifice. This process may be aided by gently tapping the sides and bottom of the cone with a rubber mallet or dead-blow hammer from the inside of the building to allow it to slip over the orifice. Once the cone is in place, fasten the bottom cone gussets to the fan panel using 1/4" X 1-1/4" bolts, 1/4" flat washers, and 1/4" whiz-lock nuts.

With the cone assembly secured in place, cut and remove the rubber band holding the cable in place and the wires holding the doors in place. Make sure all 1/4" hardware is tightened securely.

To mount the cone guard, first remove the four bolts/nuts on the guard end of the cone installed during the cone panel assembly. Then, place eight 1/4" X 2" bolts in the eight holes in the end of the cone **from the outside in**. Place a Guard Spacer on each bolt and fasten them with 1/4" whiz-lock nuts. These will serve as the Guard Studs. See Figures 17 & 18. After the Guard Studs have been fastened, mount the Cone Guard by placing the Guard eyelets over the Guard Studs and fastening each with another 1/4" whiz-lock nut. While installing the Cone Guard, take the spring at the end of the door restraining cable, and attach it to vertical guard rib as shown in Figure 19.



**Figure 17**



**Figure 18 — Guard Stud Detail**



**Figure 19 — Door Cable**

# DOOR & GUARD ASSEMBLY/GUARD MOUNTING

Next, mount the spring bracket at the center of the door ring assembly where the struts intersect. Use two cable ties to secure the spring bracket as shown in Figure 20. Attach one end of each spring to the spring bracket. The other end of each spring should be attached to the inside door hole in the damper door.

To check for proper damper operation, open the doors fully, and allow them to close. If either door fails to close properly, rotate the cone assembly slightly on the fan orifice until both doors will close properly.

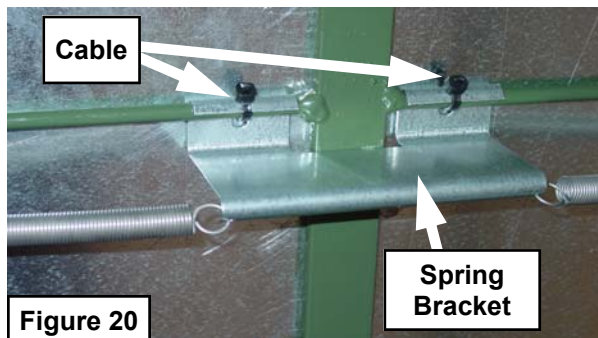


Figure 20

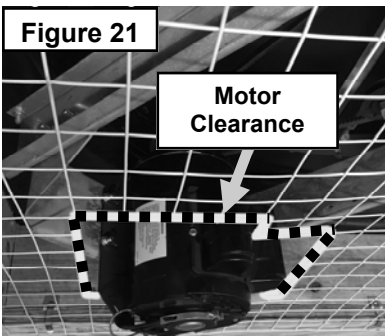


Figure 21

Be sure to install the inlet guard before operation. The inlet guard is cut to size at the factory. However, a clearance hole must be cut away for the motor to easily fit through, as shown in Figure 21.



Figure 22

Prior to guard installation, the 3 Guard Clips and 6 Guard Hooks must be secured to the fan frame. The Guard Clips consist of 'L' brackets that are fastened to the top rail of the fan frame as shown in Figure 22 (fasteners not included). The Guard Clips should be

spaced such that the Guard wire may slip between the Guard Clip and the frame. The Guard Hooks should be screwed into the sides and bottom of the fan frame. Figure 23 shows the suggested locations of the Guard Clips and Guard Hooks.

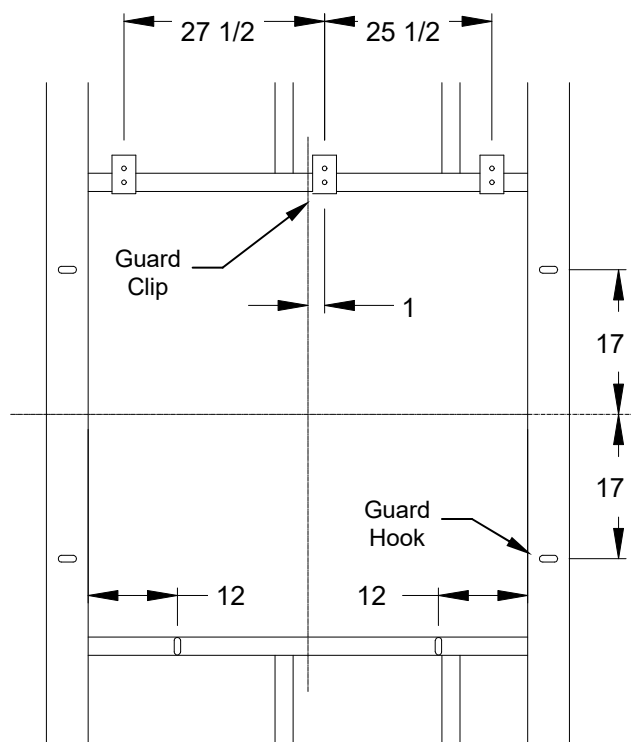


Figure 23 — Guard Clip & Guard Hook Locations

With the Guard Clips and Hooks in place, complete final assembly of the fan by placing the Inlet Guard over the Guard Clips, and secure the Guard with the Guard Hooks. Figures 24 & 25 show the final assembled unit.



Figure 24

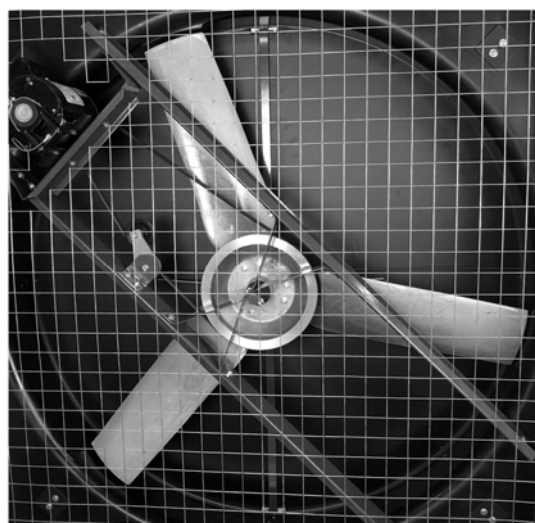


Figure 25

## BLADE AND BELT ALIGNMENT INSTRUCTIONS

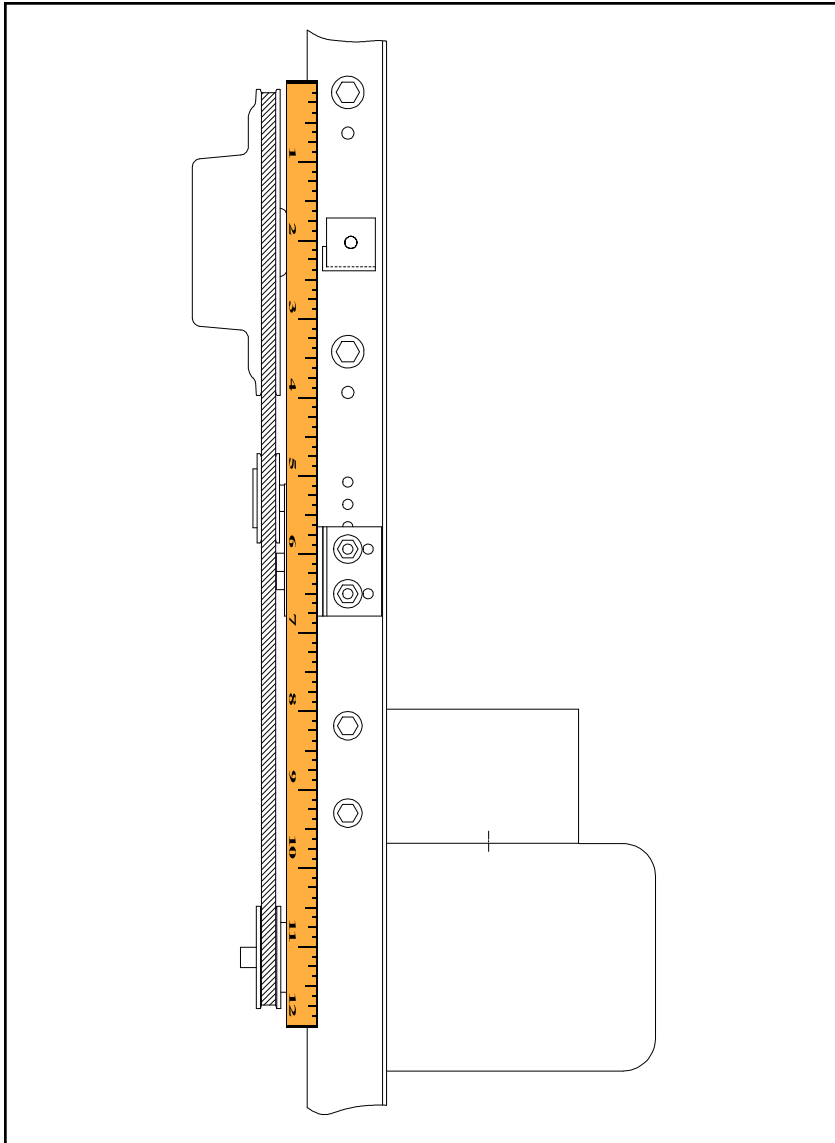


Figure 24 — Detailed View of Properly Aligned Fan Sheaves

Spin the blade assembly by hand. Make sure that the blade assembly rotates freely and did not shift during shipment. If the blades rub in the fan orifice in the direction of the fan uprights, it will be necessary to loosen the four (4) 3/8" bolts that secure the fan x-braces to the fan uprights, center the blade assembly, and tighten the bolts to 25-30 ft-lbs torque. If the blades rub in the direction perpendicular to the fan uprights, it will be necessary to loosen the two (2) 3/8" bolts that secure the blade assembly's hexagonal shaft to the fan x-braces, center the blade assembly, and tighten the bolts to 25-30 ft-lbs torque.

Next, the fan drive assembly should be checked for alignment. The fan drive assembly must be aligned for proper fan performance and to minimize pulley and belt wear. Before wiring and operating the fan, check that the drive pulley, driven disc and auto belt tensioner are aligned by using a straight edge such as a scale or yard stick. If an adjustment is necessary, loosen the set screw on the motor pulley and adjust to proper alignment. Make sure to retighten the motor pulley set screw before the fan is operated. See Figure 24.

## ELECTRICAL WIRING

All wiring must comply with national, state, and local electrical codes. If fans are to be used for livestock ventilation to support life where failure could result in loss or injury, and continuous ventilation is essential, it is recommended that the fans be wired to individual electrical circuits, or at least two circuits per room. Any minimum ventilation fans should be on individual circuits.

## WARNING

If the fans are going to be used for livestock building ventilation to support life where failure could result in loss or injury, the user must provide an adequate backup ventilation system and a failure alarm system. The user must accept the risk of such loss or injury from failure of the ventilation system.

# AUTO BELT TENSIONER

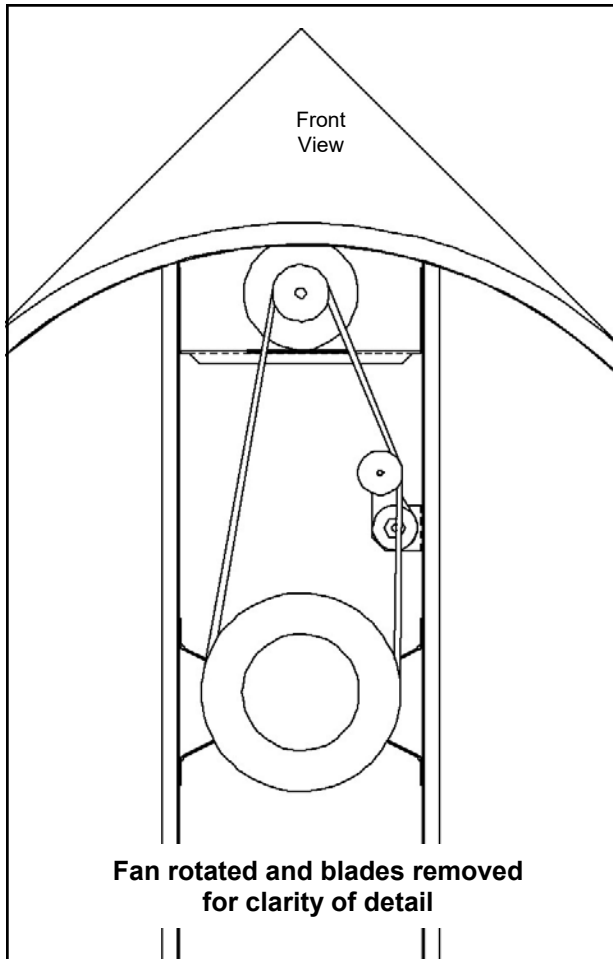


Figure 25 — Motor/Pulley, Tensioner, Disc and Belt

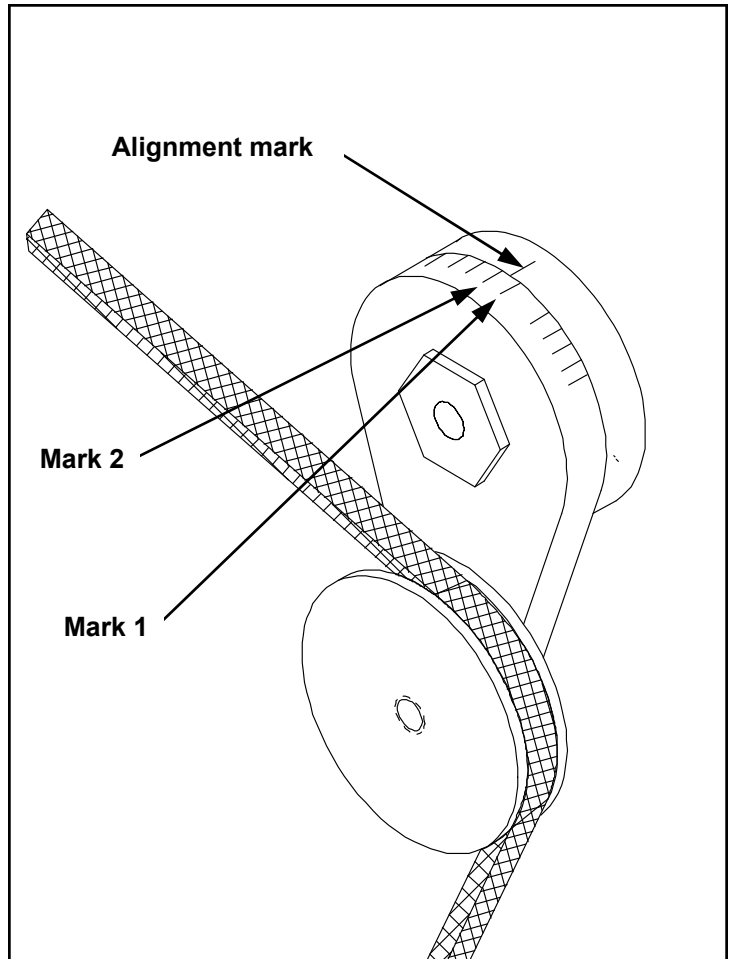
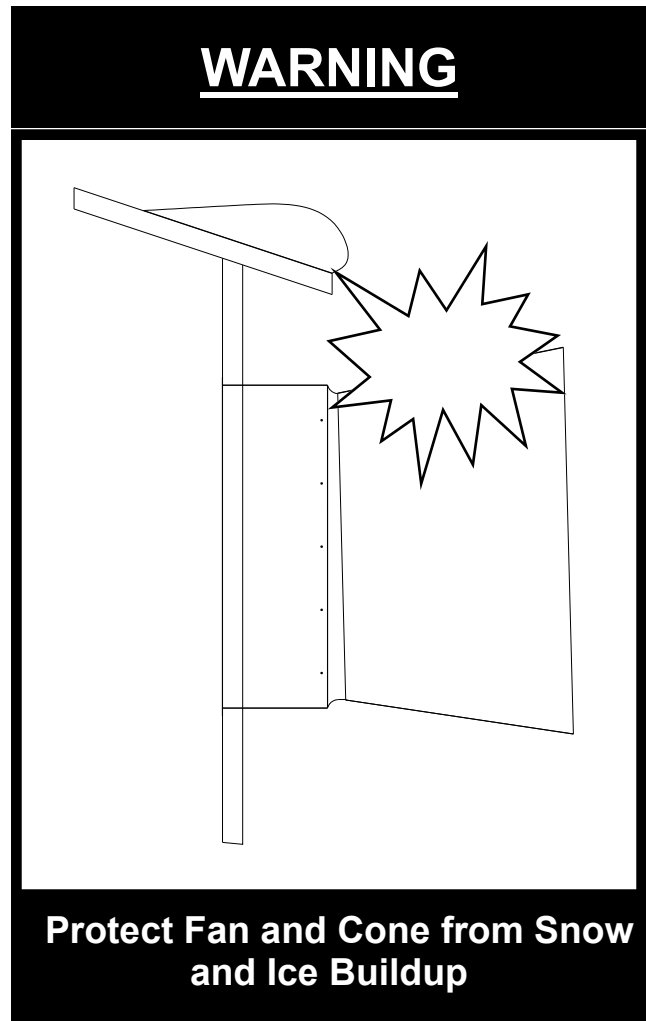
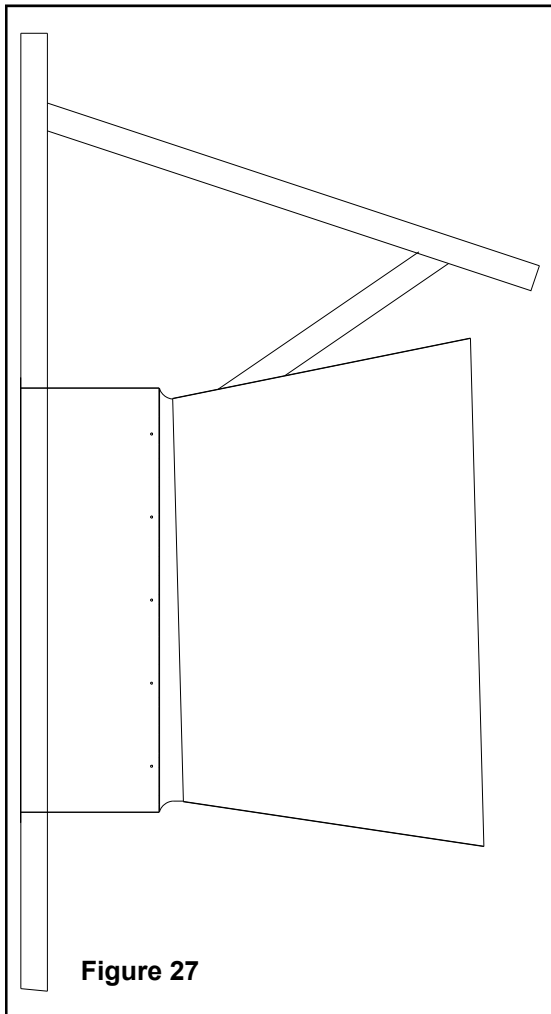


Figure 26 — Tensioner and Belt Showing Tension Alignment Marks

The Automatic Belt Tensioner comes from the factory mounted and preset for adequate belt tension. If further tensioning is required, loosen the 3/8" bolt holding the tensioner to the tensioner bracket. Then, using a 15/16" wrench, rotate the tensioner assembly such that the alignment mark is between mark 1 and 2 on the idler arm (see Figure 19). Re-tighten the 3/8" bolt. Turn the blade assembly by hand to insure free rotation. **Do Not Over Tension The Belt.** This will cause premature belt and bearing failure. To check that the belt tension is not too high, place a finger midway between the fan pulley and motor pulley and push inward about 1/2". The force required to do this **is not** to exceed 5 pounds.

## CONSTRUCTION FOR WINTER WEATHER PROTECTION



If your area is subject to snow, consideration must be taken to protect from the possibility of snow and ice building up on the roof and sliding down onto the fan and cone. One option is to build a small section of roof over the fan and cone. See Figure 27.

### **WARNING**

**Fan and/or cone damage caused by this type of external source WILL NOT be covered by AMERICAN COOLAIR warranties.**

During winter months, you may not need to operate all of your fans. It is advisable to seal up those fans which will not be used during the colder months to minimize heat loss as well as condensation. To do this, turn the fan control off, and insulate the fan intake.

## INITIAL STARTUP

1. With inlet guard not installed, spin the blade assembly by hand and make sure that the blade assembly rotates freely and did not shift during shipment. If the blades rub in the fan housing, refer to Page 8 for instructions on centering the blade assembly.
2. Check belt for proper tension.
3. Check motor pulley, driven disc and idler pulley (if present) for proper alignment.
4. Check to make sure all fasteners are properly tightened.
5. Check circuit phase, voltage and wiring connection against that shown on motor nameplate.
6. Check for correct fan rotation.
7. Replace the inlet guard. The fan is now ready for proper operation.

## MAINTENANCE

### CLEANING

- The fan should be cleaned regularly. Always turn the fan off and disconnect the power connection before cleaning.
- The motor should be wiped with a cloth or a brush. This will keep the motor running cool. **DO NOT** pressure wash the motor.
- The blades should be wiped clean to maintain maximum air performance and minimize fan imbalance. **DO NOT** pressure wash the center of the disc assembly, or premature bearing failure may be induced.
- The damper door assembly should be wiped clean so that the doors will pivot freely, open completely, and close securely.
- The interior sides of the fan, wall housing & doors, should be washed properly after disinfecting the house to prevent rusting. We recommend using Simple Green detergent or a similar product.

### CHECK FASTENERS

Inspect all fasteners on the fan. This is a very important safety issue. If any loose hardware is found, tighten it immediately.

### CHECK BELT TENSION

The belt must have proper tension to insure proper fan speed and maximum air performance. Refer to Page 9 if re-tensioning is necessary.

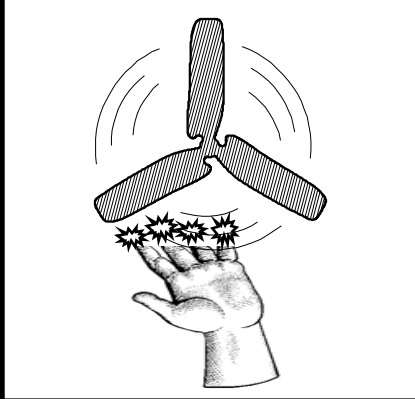
### CHECK DRIVE ALIGNMENT

The belt must be properly aligned in the pulleys to minimize pulley and belt wear. Refer to Page 8 for instructions.

### CHECK DOOR-RING GASKET

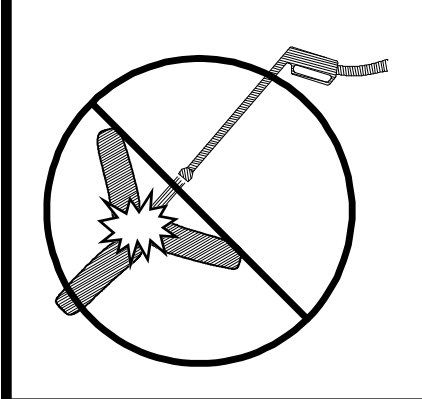
The door-ring is lined with a foam rubber gasket material. This gasket provides a seal between the door-ring and the doors, insuring proper door function and minimizing air leakage. This gasket should be checked periodically to make sure it is intact and properly sealed to the door-ring. If the material should come loose from the door-ring, it must be re-sealed to the door-ring with appropriate adhesive.

**WARNING**



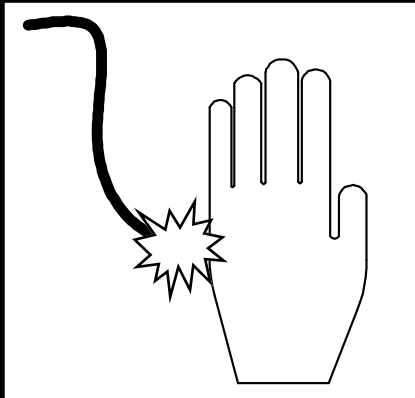
— Moving Parts —  
Disconnect power  
before servicing the  
fan

**WARNING**



Precision Bearings  
**Do Not**  
Pressure Wash at  
blade assembly center

**WARNING**



— High Voltage —  
Disconnect power  
before servicing the  
fan

**WARNING**

**CAUTION**



**DO NOT** INSTALL FAN WITH MOVING PARTS WITHIN 8 FEET OF FLOOR OR GRADE LEVEL WITHOUT A GUARD THAT COMPLIES WITH OSHA REGULATIONS. **DO NOT** USE UNLESS ELECTRICAL WIRING COMPLIES WITH ALL APPLICABLE CODES. **DO NOT** WIRE WITHOUT PROVIDING FOR A POWER SOURCE DISCONNECT AT THE FAN ITSELF. **DO NOT** SERVICE EXCEPT BY A QUALIFIED MAINTENANCE TECHNICIAN AND ONLY AFTER DISCONNECTING THE POWER SOURCE. FAILURE TO OBSERVE THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY OR DEATH.



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