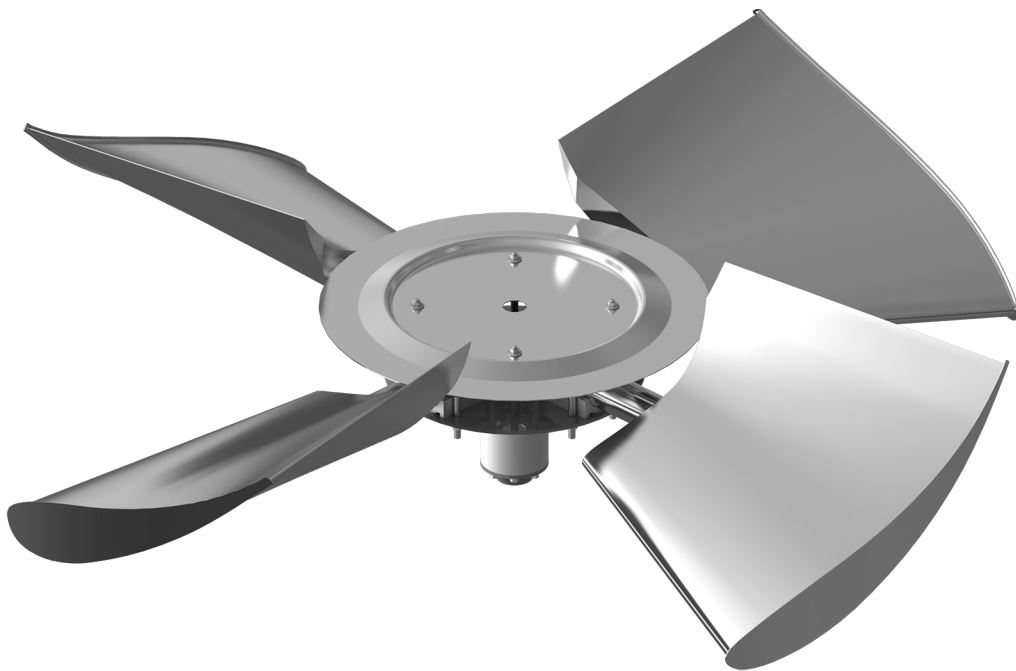


# **Credit® Ultra Low Noise** fan 84"-144" diameter

INSTALLATION - OPERATION - MAINTENANCE

**Z1095330** ISSUED 07/2019

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT





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## safety and handling

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### Safety

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#### Warning

***Because of the potential for property damage and/or danger to personnel, it is critical to follow the proper selection, installation and operating procedures.***

***Exposed rotating devices are potentially dangerous and can cause injury or death. They must be guarded in compliance with OSHA, ANSI and all other local standards for the specific application.***

***All personnel must follow applicable work safety standards, such as Lockout/Tagout procedures while working in or around power transmission devices.***

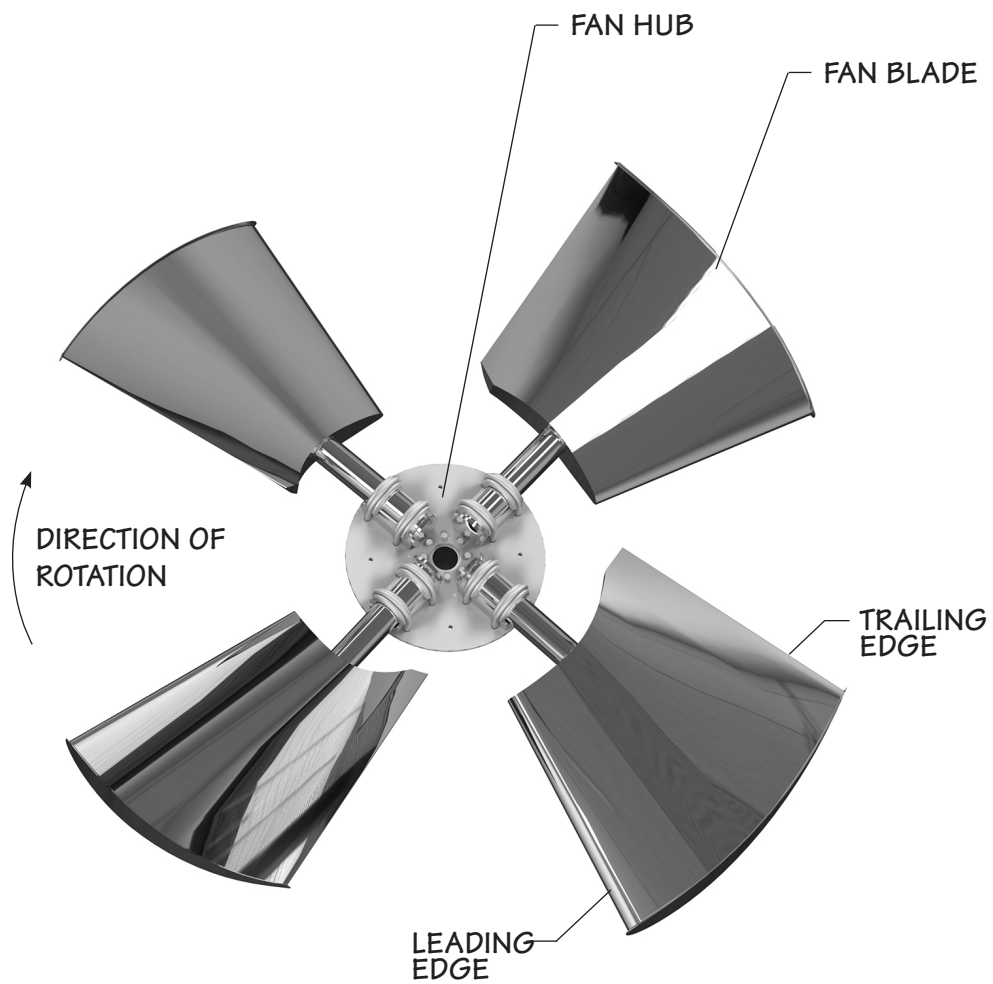
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### Handling Considerations

- 1—Credit Ultra Low Noise Fans are designed and manufactured to be very durable and can provide years of service if handled properly.
- 2—Minor aesthetic imperfections, such as surface abrasions or scuffs may be present from manufacturing or handling and will not affect performance. Heavy, concentrated impacts may cause gouges, penetration or dents in the blades. If any damage is observed, the fan should not be placed into service. Only SPX Cooling Technologies engineering is authorized to evaluate any issues exceeding the above description of minor aesthetic imperfections.
- 3—The entire fan assembly should be inspected periodically or after any changes to the drive system components.

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## components



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**Figure 1**

Order No. \_\_\_\_\_

Trial Pitch Angle \_\_\_\_\_

Final Pitch Angle \_\_\_\_\_

Speed-rpm \_\_\_\_\_

Contract hp \_\_\_\_\_

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## assembly

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### Note

***The following instructions apply to installations having straight bores or tapered output shafts without split taper bushings.***

Preassemble the fan assembly prior to installation.

Ultra Low Noise fans are statically balanced as a complete assembly and shipped unassembled. To ensure proper reassembly, blades and hub are match-marked.

1—Select a large open area corresponding to the fan diameter.

2—Position the fan hub in the center of the work area with the hub taper down.

See **Figure 1**.

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### Note

***Proper assembly, with particular attention to tightening hardware to the specified torque is essential to maintain the design integrity of the fan.***

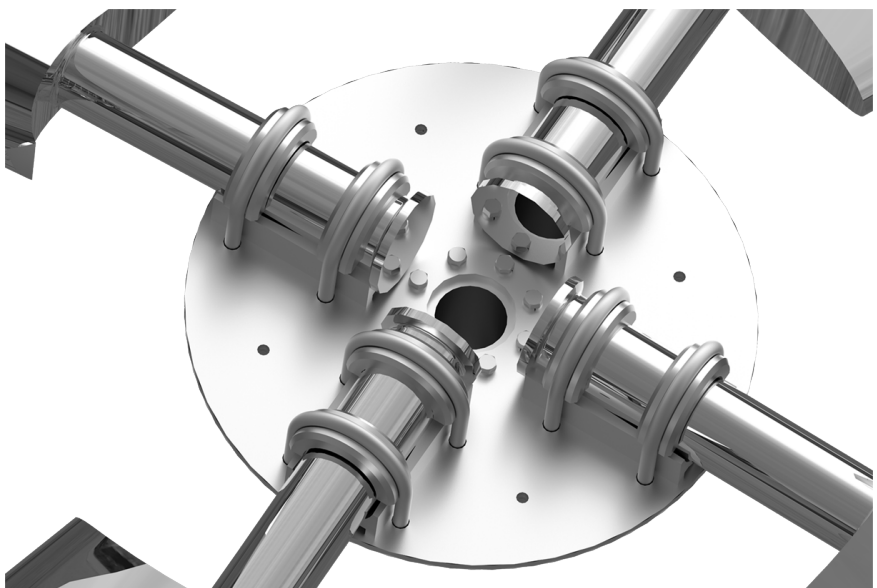
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### Note

***The following instructions apply to fans larger than 96". Fans 96" and smaller utilize upper and lower blade clamps and hardware. See Figure 4.***

3—Place a blade saddle on the hub and install a blade with corresponding match mark, upper U-bolts and U-bolts. On fans where the blades overlap at the hub be sure to have the leading edge under the trailing edge of the forward blade. Refer to **Figure 3**.

4—Ensure the blade shank safety collar is inboard of the blade saddle. Refer to **Figure 2**.

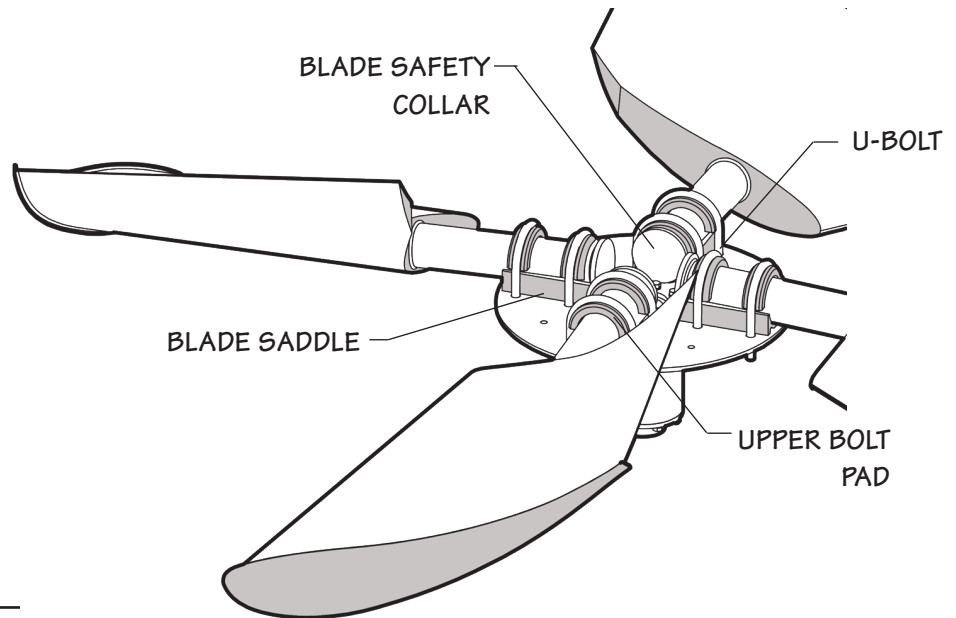


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**Figure 2**

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assembly



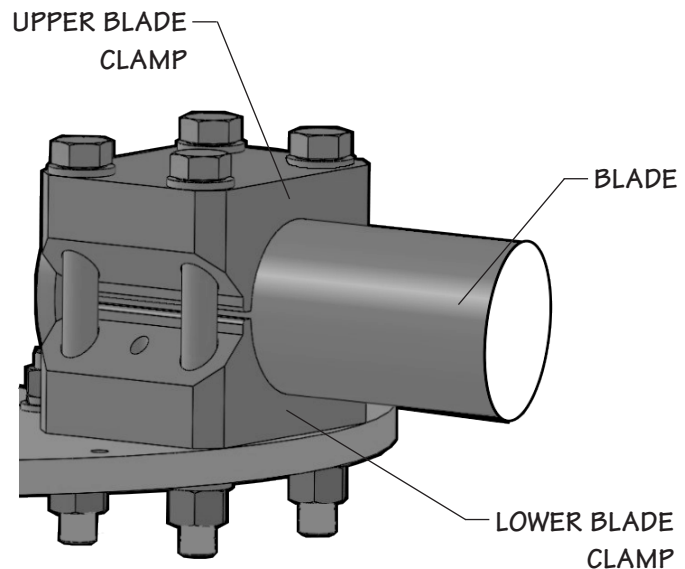
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**Figure 3 - U-Bolt Assembly**

5—Lubricate U-bolt threads with anti-seize compound and finger tighten the U-bolt hardware. Pull blade radially outward to be certain the shank safety collar is in contact with lower blade saddle. Refer to **Figure 2**. Progressively tighten the U-bolts until the blades are barely able to move when twisting the blade.

6—Repeat steps 3 through 5 for all blades.

7—Final pitch adjustment and tightening of U-Bolts is completed when fan is secured in the tower.



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**Figure 4 - Clamp Assembly**

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## installation

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### **Warning**

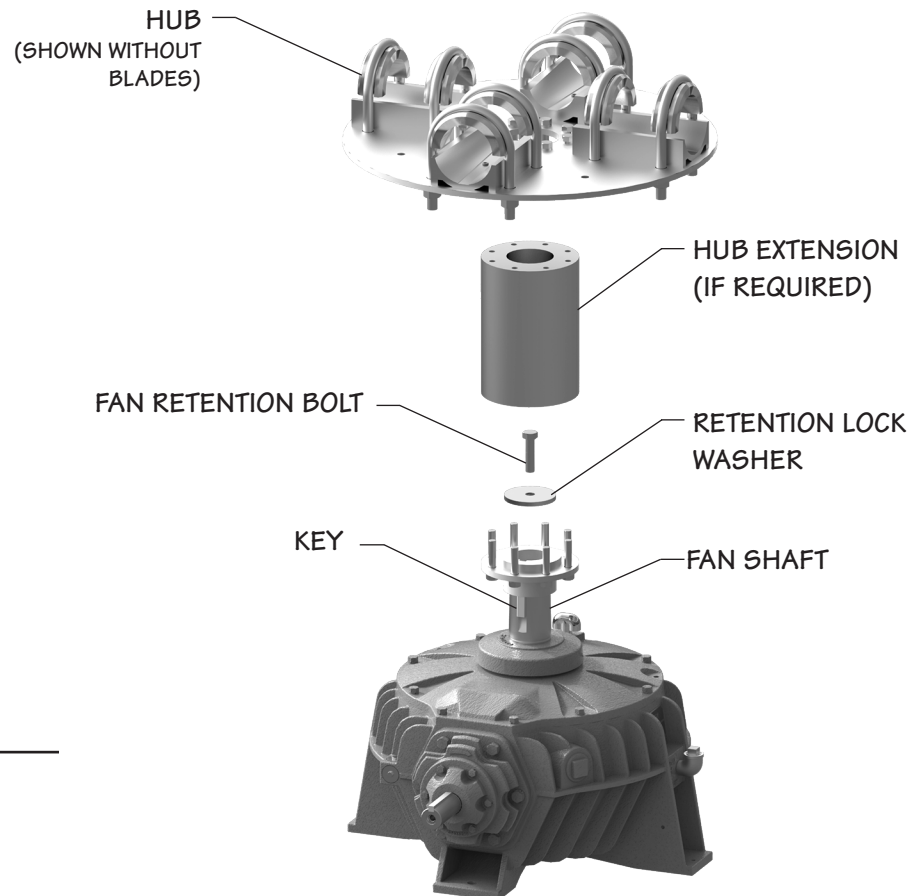
***Fan motor must be locked out before proceeding.***

- 1—Clean the hub bore and fan shaft extension for the full length of the key.
- 2—Insert the key in the keyway. The top of the key must be below the top of the shaft by not more than  $\frac{1}{8}$ " (3mm). The key is a tight fit across the width and must never be altered.
- 3—After cleaning, apply a coat of anti-seize compound to the engagement portion of the shaft.
- 4—Raise the fan assembly above the shaft and slowly lower the hub onto the shaft with the keyways aligned. Make certain the key does not slide down during installation.
- 5—Tighten set-screw over key to 12 ft-lb (17 N·m) .

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### **Note**

***Installation is applicable to the fan assembly being installed on a gear drive or belt-drive fan shaft. Gear drive shown.***

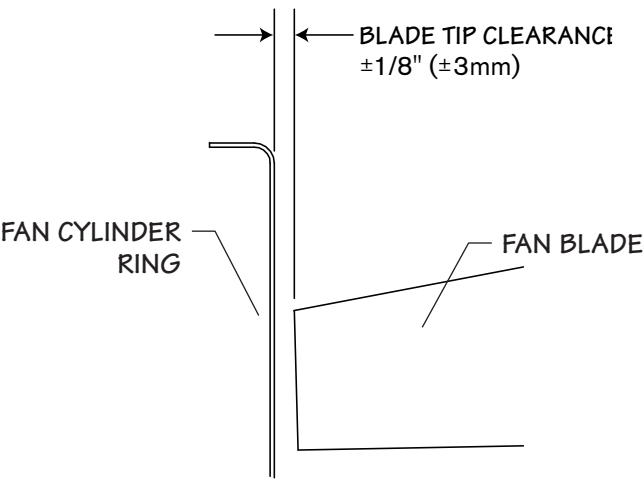


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**Figure 5**

# installation

- 6—Install the hub retention bolt with the lock washer and torque to 50 ft-lb (68 N·m). If the standard hub retention bolt is too short, locate a longer one in the fan retention hardware kit.
- 7—Install lubricated fan hub extension (if needed) and tighten all bolts to 75 ft-lb (105 N·m).
- 8—After installing the fan hub and blades, manually rotate it to be sure the blades clear the inside of the fan cylinder at all points. Blades should clear the fan cylinder by a distance adequate to provide for any relative motion between the fan and the cylinder. Excess clearance between the blade tips and the cylinder should be avoided to prevent backflow, which seriously reduces fan efficiency. Correct blade tip clearance dimensions are shown in **Table 1**.



**Figure 6**

Fan Diameter	Blade Tip Clearance
84"	$\frac{7}{16}$ " (11 mm)
96"	$\frac{1}{2}$ " (13 mm)
120"	$\frac{5}{8}$ " (16 mm)
132"	$\frac{5}{8}$ " (16 mm)
144"	$1\frac{1}{16}$ " (17 mm)

**Table 1**

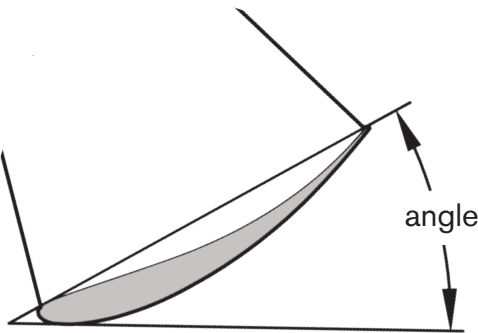
# installation

## Adjusting Blade Pitch

### Note

**The trial pitch is the calculated setting for design conditions** (water rate, heat load, air density, and brake horsepower). **The trial pitch is provided by SPX** (see page 2).

- 1—Select a position on the fan circumference and rotate each blade to this common location when setting or checking blade pitch. Support the blade tip to maintain a common rotation plane while setting the fan pitch. The pitch is set by placing a protractor on top of a straight edge or with a digital level that extends across blade near the tip as shown in **Figure 7**.
- 2—Be sure all blades are positioned correctly on hub, then set the pitch. Blades should be within  $\pm 1/4^\circ$  of the desired pitch angle. After the desired setting is obtained, progressively tighten the U-bolt nuts according to **Table 2**. Recheck the pitch angle. If required, loosen the hex nuts and reset the pitch as necessary until the proper pitch angle is obtained.



**Figure 7**

**Table 2**

Bolt Diameter	Torque N·m (ft·lb)
M12	44 N·m ( 32 ft·lb)
M16	105 N·m ( 75 ft·lb)
M24	365 N·m (265 ft·lb)

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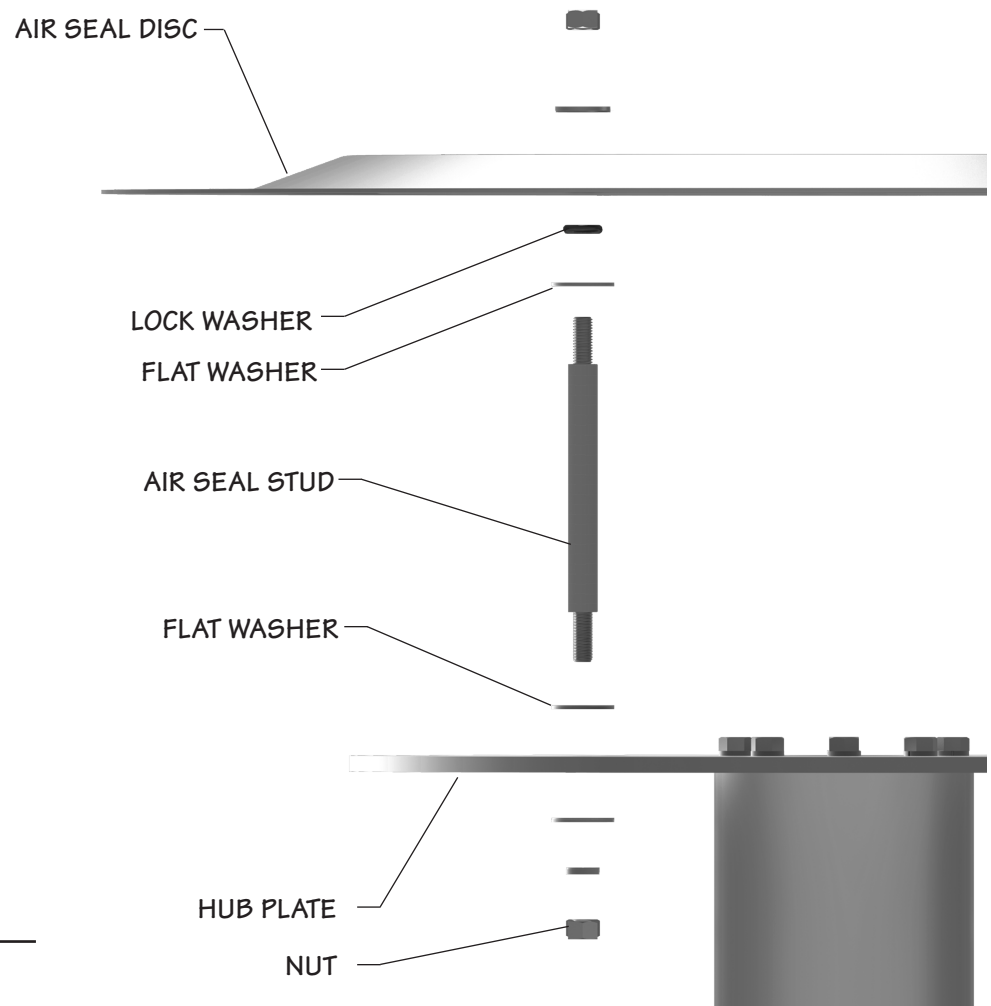
## installation

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### Air Seal Installation

The air seal is a thin sheet metal disc that is required to prevent the back flow of air through the center of the fan to maximize the fan's efficiency.

- 1—Locate the air seal installation hardware.
- 2—Install the air seal studs on the hub – finger tighten.
- 3—Place one flat washer on each stud as shown in **Figure 8**.
- 4—Place the air seal onto the studs and install the remaining hardware following the sequence shown.
- 5—Tighten all of the nuts for the Air Seal hardware.



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**Figure 8**

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## maintenance

Preventative maintenance will prolong useful life and assure continued trouble-free operation. After the first week and subsequently at six month intervals:

- Check all hardware torque to specifications referenced in this manual.
- Visually inspect the fan for airborne debris damage, contact with fan cylinder segments and corrosive attack. Correct any situations determined detrimental to the fan operation.
- Remove any accumulated scale or dirt.
- Clear the blade drain holes at the fan tip.

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## Service

Proper identification of your fan is necessary to ensure you receive correct replacement parts. The Marley cooling tower serial number can be used to determine the fan and any components installed and maintained as original equipment on a Marley cooling tower. Please provide the Marley sales representative the necessary information when ordering replacement fans or components.

Replacement of individual fan blades may require rebalancing the entire fan. If rebalancing is desired, contact the Marley sales representative in your area.

The corrected horsepower should be close to, but not exceed the contract horsepower specified by SPX Cooling Technologies, Inc. Determine corrected horsepower using the following equation.

$$HP_C = \frac{VOLTS_A \times AMPS_A \times DENSITY_D}{VOLTS_N \times AMPS_N \times DENSITY_A} \times HP_N$$

$HP_C$	= Corrected Horsepower	$VOLTS_N$	= Nameplate Volts
$VOLTS_A$	= Actual Volts	$AMPS_N$	= Nameplate Amperage
$AMPS_A$	= Actual Amperage	$HP_N$	= Nameplate Horsepower
$DENSITY_A$	= Actual Air Density	$DENSITY_D$	= Design Air Density

Actual volts and amperage must be obtained with the fan running and the specified rate of water flowing over the tower after the motor and drive system have reached operating temperature (approximately 30 minutes of operation).



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## maintenance

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### Note

*Measurements taken on motors operating with Variable Frequency Drive controls may read up to 15% high from errors in measuring the approximated sine wave. Instruments capable of measuring a squared off wave-form accurately should be used for measuring power in this situation.*

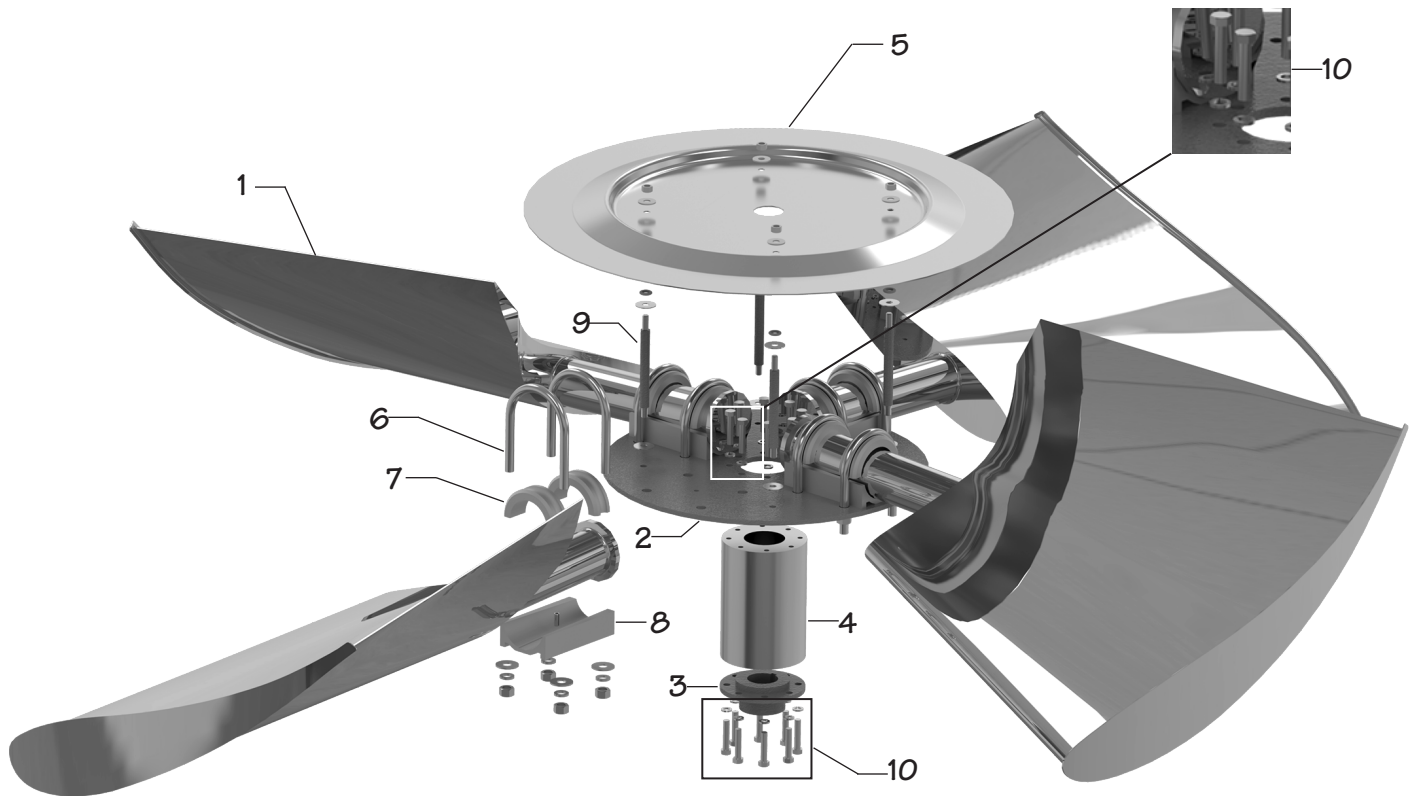
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### Caution

*Do not start the motor more than four to five times per hour (each low speed start and each high speed start count as one start).*

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## parts list



1	FAN BLADE	6	U-BOLT
2	HUB PLATE	7	UPPER BOLT PAD
3	FAN COUPLING HUB	8	BLADE SADDLE
4	EXTENDER HUB (IF APPLICABLE)	9	AIR SEAL STUD
5	AIR SEAL DISC	10	HUB HARDWARE

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### Note

***When ordering parts always provide the cooling tower serial number and if possible, the fan serial number located on the fan hub.***





# Credit Ultra Low Noise fan

USER MANUAL

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