MARLEY®

user manual

X7 fan

INSTALLATION - OPERATION - MAINTENANCE

Z0331480_A ISSUED 06/2016

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



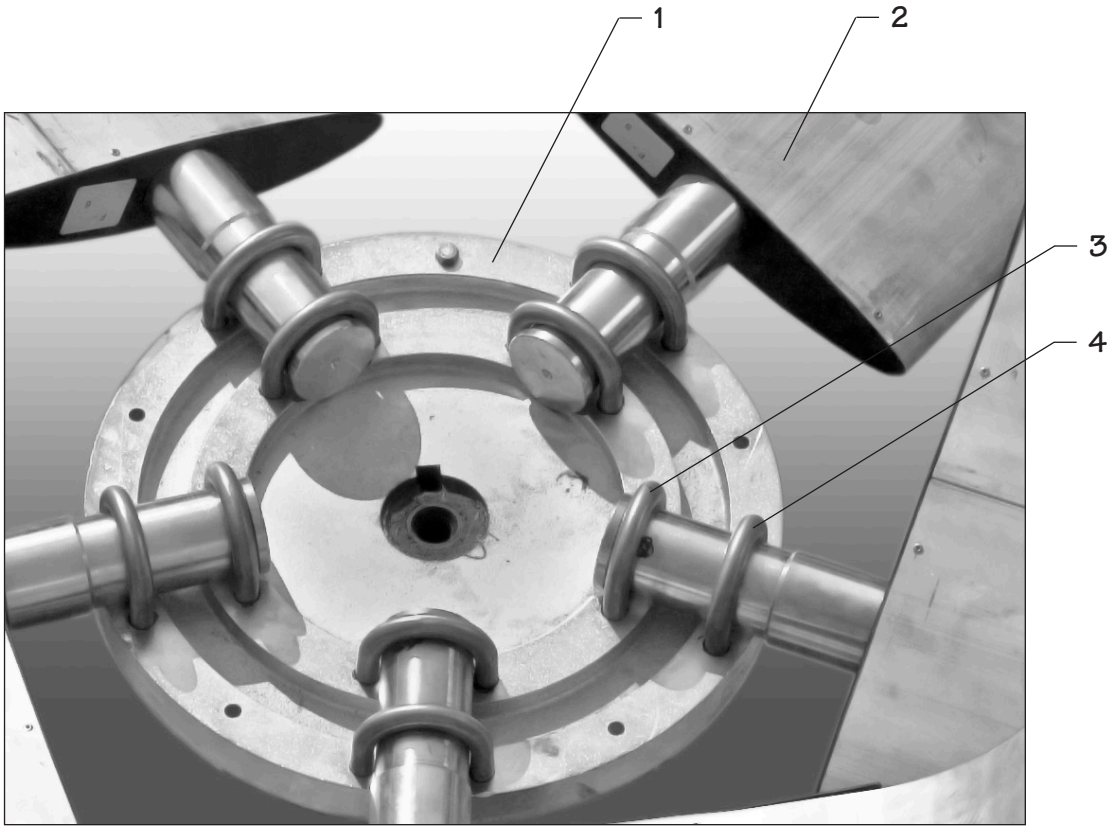


Figure 1–Typical Fan Assembly

Order No. _____

Trial Pitch Angle _____

Final Pitch Angle _____

Speed-rpm _____

Contract hp _____

fan assembly

Note

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

It is convenient to preassemble the fan prior to installation on the driving shaft.

Marley X7 fans are statically balanced as a complete assembly. If fan is shipped unassembled, blades and hubs are match-marked to insure proper re-assembly.

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

2–Position the fan hub **1** in the center of the work area with the blade sockets up.

3–Place a blade **2** in a blade socket on the hub. 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 2**.

4–Ensure the blade shank safety collar is inboard of the inner hub rim. Refer to **Figure 3**.

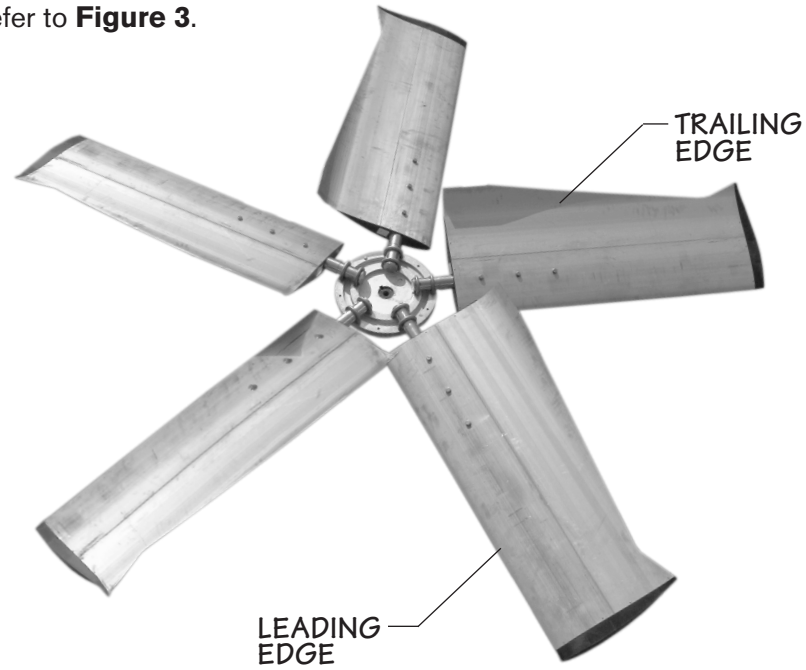


Figure 2

5–Lubricate U-bolt threads and bearing surface of self-locking nuts. Install U-bolt through inner row of holes in the hub. Finger tighten the self-locking nut with flat washer onto U-bolt threads. Progressively tighten each leg of the U-bolt until blade is held in place.

6–Pull blade radially outward to be certain the shank safety collar is in contact with hub inner ring. Refer to **Figure 3**.

7–Repeat steps 5 and 6 as required with the outer U-bolt **4**.

8–Repeat steps 3 through 7 for all blades.

9–Progressively tighten each side of the U-bolt until the blades are barely able to move when twisting the blade.

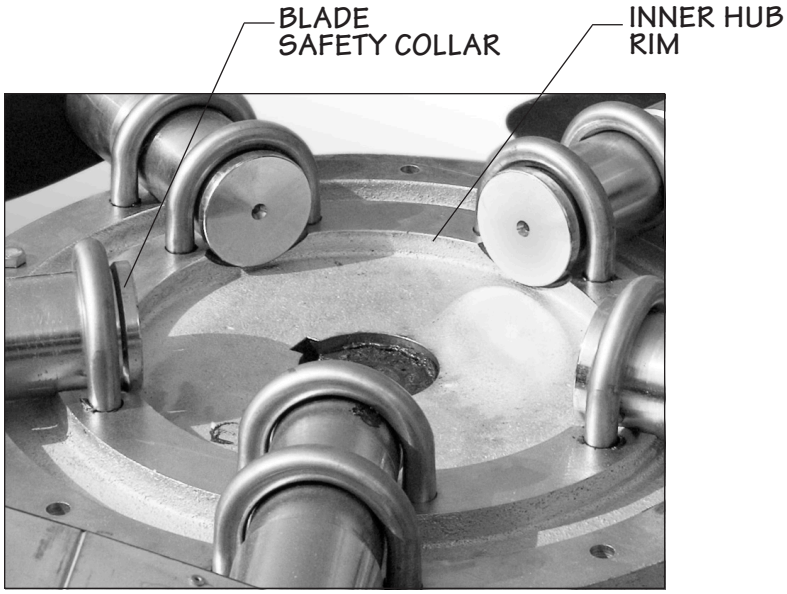


Figure 3

Fan Installation Instructions

1–Be sure motor is locked out.

2–Clean the hub bore and driving shaft extension for the full length of the key.

3–Insert the key in the keyway. The top of the key must be below the top of the shaft by not more than 1/8″ (3 mm) . The key is a tight fit across the width and must never be altered.

4–After cleaning, apply a coat of anti-seize compound to the engagement portion of the shaft.

5–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.

6–Install the Hub Retention Cap Screw with Lock Washer. Torque hub retention cap screw to 40 ft·lb$_f$ (54 N·m).

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. For flare-tip blades, the pitch is measured across the end cap as shown in **Figure 4**. For full chord blades, the pitch is measured across the aluminum airfoil about 1" inboard of the end cap as shown in **Figure 5**.

2–Be sure all blades are positioned correctly on hub, then set the pitch. Blades should be within ± 1/4° of the desired pitch angle. After the desired setting is obtained, progressively tighten the U-bolt nuts according to **Table 6**. Recheck the pitch angle. If required, loosen the hex nuts and reset the pitch as necessary until the proper pitch angle is obtained.

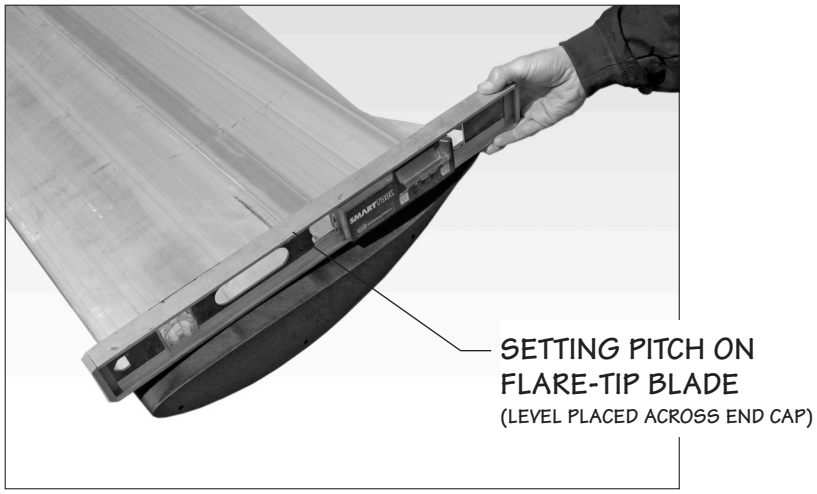


Figure 4

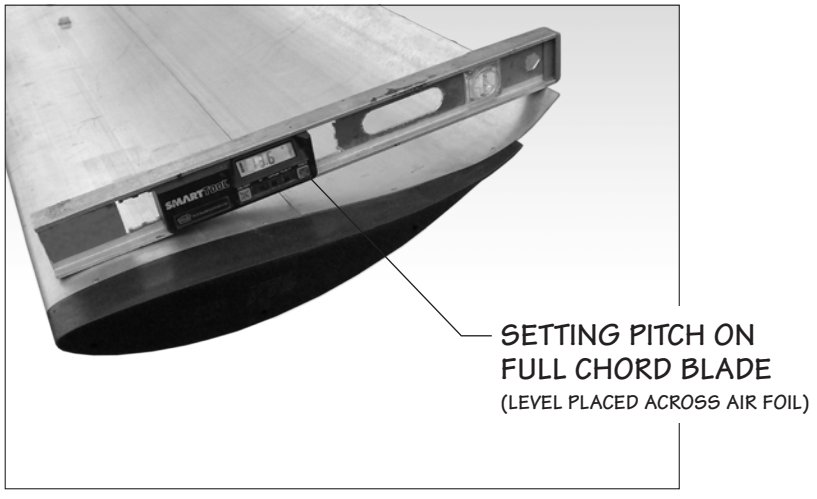


Figure 5

Table 6

Fan Model	Bolt Diameter mm	Torque Wrench Setting	
		$ft{\cdot}lb_f$	N·m
X71	12	40	54
X72	16	70	95

maintenance

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

- Torque all hardware 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 fan operation.
- Remove any accumulated scale or dirt.
- Clear blade drain holes at fan tip.

service

Proper identification of your fan is necessary to insure 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.

motor load

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

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 Geareducer have reached operating temperature (approximately 30 minutes of operation).

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

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

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.

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).

X7 fan

USER MANUAL

SPX COOLING TECHNOLOGIES, INC.
7401 WEST 129 STREET
OVERLAND PARK, KS 66213 USA
913 664 7400 | spxcooling@spx.com
spxcooling.com

Z0331480_A | ISSUED 06/2016
COPYRIGHT © 2016 SPX CORPORATION
In the interest of technological progress, all products are subject to design and/or material change without notice.

SPX