

Cofimco Fan

User Manual

M and MR Style Hubs

Fan Components

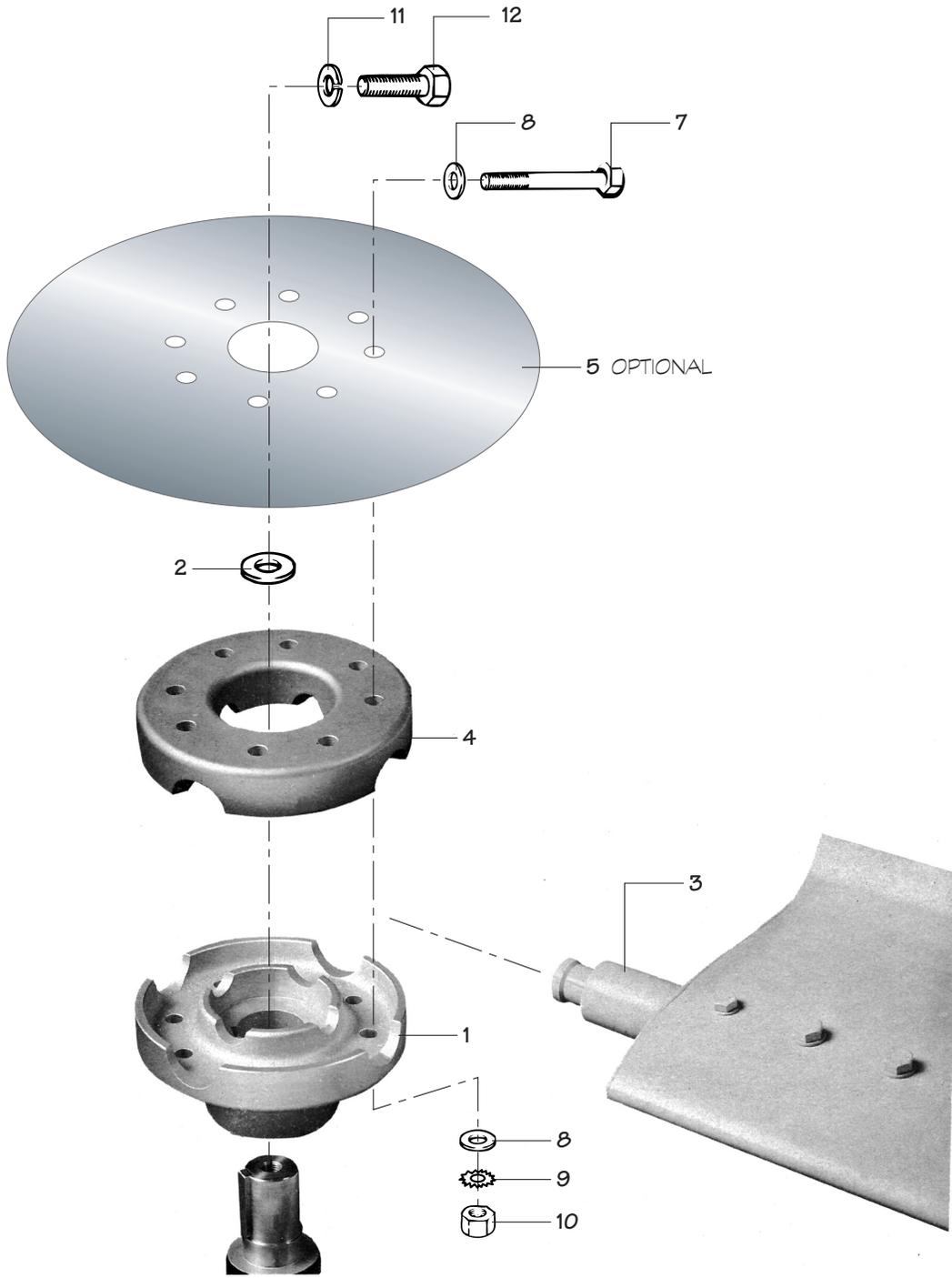


Figure 1—Typical Fan Assembly
actual component appearance may vary

Marley Order No. _____
 Trial Pitch Angle _____
 Final Pitch Angle _____
 Speed-rpm _____
 Contract hp _____

Fan Assembly Instructions

△ 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.

- 1—Select a large open area corresponding to the fan diameter.
- 2—Position the lower fan hub **1** in the center of the work area with the blade sockets up.
- 3—Locate the large hub retention washer **2** from the driving shaft and place it over the center bore.
- 4—Place the blades **3** in the blade sockets of the lower 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**.

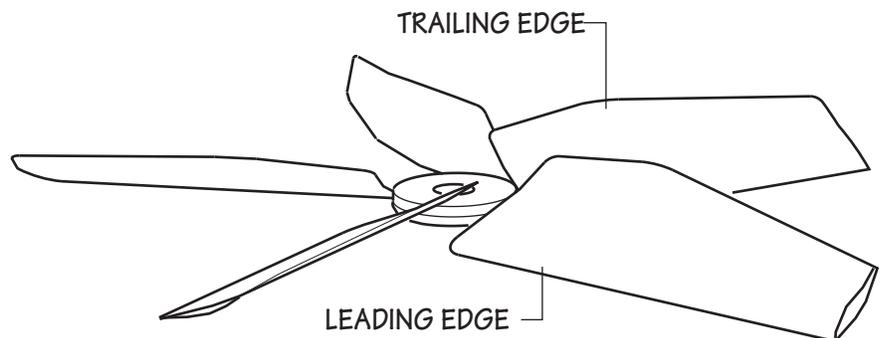


Figure 2

- 5—Place the Upper Fan Hub **4** over the blade shanks.
- 6—Align the Hub Cover **5**, if present, with the bolt holes in the Upper Fan Hub.
- 7—Insert the Machine Bolts **7** with Flat Washers **8** from the top side in each bolt hole.
- 8—Press the Upper Hub portion down to engage a Flat Washer **8**, Lock Washer **9** and Nut **10** onto the Machine Bolt **7**. Repeat until all fasteners are hand tight.



9—Ensure the fan blade shanks are properly aligned with the Upper and Lower Hubs and the safety collar on the blade engages the hubs correctly. Pull blades radially outward until safety collar is in contact with hub. Refer to **Figure 3**.

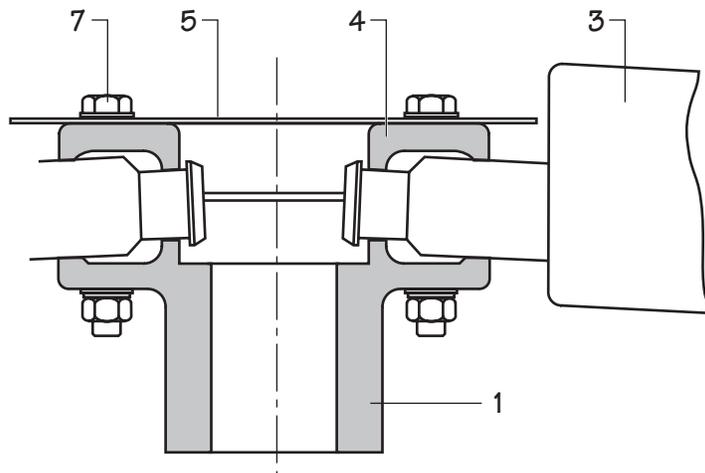


Figure 3

10—Progressively tighten the hub hardware in a crossing pattern until the blades are barely able to move when twisting the blade.

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 Lock Washer **11** and Hub Retention Cap Screw **12**. Torque hub retention cap screw to 40 ft·lb_f (54 N·m).

Adjusting Fan 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 Marley Cooling Tower (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 3/16" (5 mm) inboard of the blade tip by placing a bevel protractor on top of a parallel sided straight edge that extends across blade width as shown in **Figure 4**.

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 hardware according to **Table 5**. Recheck the pitch angle. If required, loosen the hex nuts and reset the pitch as necessary until the proper pitch angle is obtained.

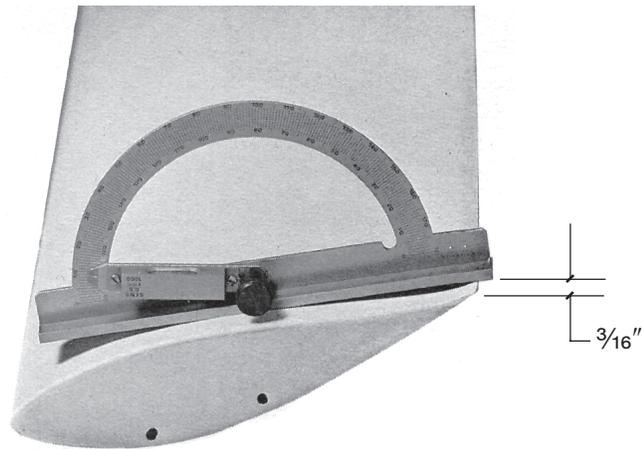


Figure 4

Bolt Diameter in	Torque Wrench Setting	
	ft·lb _f	N·m
5/8"	172	239
3/4"	300	410
7/8"	405	560

Table 5

Fan 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.

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 office or sales representative the necessary information when ordering replacement fans or components.

Blades can be replaced without rebalancing the entire fan.

If rebalancing is desired, contact the Marley sales office or representative in your area.

Motor Load

The corrected horsepower should be close to but not exceed the contract horsepower specified by Marley. 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 exceed 30 sec/hour total motor starting time as motor may overheat.

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