



COOK MFG

TUBE AXIAL FAN MANUAL



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Receiving Inspection:

All shipments should be inspected for damage at the time of receipt. Any damage must be noted on the carriers' bill of lading. All shipping damages must be reported to our customer service team within 3 business days to file a claim against the carrier. All items included with your order must be compared against the packing list. Customer must notify our customer service team of any missing parts within 7 business days. Any parts determined to be missing will be provided to the customer free of charge.

Safety Information:

This manual should be read and understood before installing, operating, or performing any maintenance activities. Never allow anyone to operate the equipment without proper training. Contact Cook Manufacturing if you have any questions regarding the safe installation, operation, and maintenance procedures stated in this manual.

Safety Devices:

Do not attempt to bypass or eliminate any safety devices.

Guards:

All moving parts are required to be guarded to prevent injury. Never operate the fan without all guards in place. Inlet and outlet guards are the responsibility of the customer.

Sound:

Sound levels will vary based on several factors. It is the customers responsibility to ensure that sound levels do not exceed applicable laws and requirements for the personal exposed to the equipment.

Air Flow / Suction:

The tube axial fan generates a large amount of suction and airflow. Never operate the fan without proper inlet and outlet guards. The large amount of suction can draw items into the fan creating projectiles than can cause severe injury or death. The large amount of airflow can move nearby objects or personnel resulting in injury.

Personal Protective Equipment:

The following list of personal protective equipment should be used during installation:

	Protective Eyewear
	Hard Hat
	Steel Toe Boots
	Gloves

Table 1 - Recommended Personal Protective Equipment

Installation:

Tube axial fans are designed specifically for either intake or exhaust applications. Intake applications bring in clean outside air. Exhaust applications extract air from an area and discharge it to the outside through ductwork.

Handling:

Tube Axial fans can be lifted using an appropriate sling around the housing of the fan. Never attempt to lift the fan by the motor, blade, or shaft as this will damage the fan.

Location:

Tube axial fans can be installed indoors or outside with a motor weather cover.

Orientation:

Tube axial fans can be mounted vertically or horizontally for exhaust or intake applications. Intake air applications require additional safety features such as a pinned shaft or locking collar. Verify these safety features are present before installing a fan used for intake air applications.

Ductwork:

Ductwork requirements vary by application. Typical ductwork configurations include at least one exterior wall or roof penetration. If you are using exhaust duct with a traditional wet paint booth, the exhaust must protrude 6' above the roof before the rain cap or auto damper is installed to meet code requirements. Additionally, exhaust must also terminate at least 10' away from any intake or other openings. Check with your local regulatory agency to ensure compliance.

Regardless of application, the following ductwork layout requirements must be met to preserve the manufacturer's warranty. Contact Cook Manufacturing if you need assistance or have any questions regarding proper ductwork layout.

- All ductwork must be the same diameter as the fan. Reducing the diameter of the duct creates additional static pressure, lowers airflow, and reduces the operational life of the fan.
- A straight section of duct, with length of at least one and a half times the diameter of the fan, is required before and after each elbow.
- A maximum of two elbows can be used.
- Total length of ductwork must not exceed 25'.

Mounting:

- If your fan is equipped with optional axial fan brackets, mount them as shown below in Figure 1.



Figure 1 – 24" Tube Axial Fan with Axial Fan Brackets

- Lift the tube axial fan from the mounting rings or housing using a sling and place the fan in the location to be installed.
- Ensure correct orientation by double checking the airflow label on the side of the fan.
- Make sure the motor can be easily accessed for maintenance.
- Secure the fan to the structure and/or ductwork using 5/16 X 3/4" spin lock bolts and nuts. All fasteners should be torqued to 210 In*Lbs.
- Seal all joints and connections between the fan and ductwork or equipment using a water-based sealant that will adhere to metal.

Electrical:**Hazards:**

All electrical activities must be performed by a licensed local electrician who is familiar with both local and national codes. All power sources should be locked out before wiring is connected to the main power source.

Disconnect Switch:

A disconnection switch should be located in close proximity so power can be shut off in case of an emergency. Disconnect switches should have the ability to be locked out anytime an inspection or maintenance is performed according to OSHA's lock out tag out procedure. All disconnects should be sized and rated according to the latest NEC or National Electrical Code along with any local codes. Time delayed fuses are recommended to be used with all disconnects.

Control Methods:

A motor starter or variable frequency drive is required to operate and protect the electric motor. Failure to use the proper motor control device may result in damage to the electric motor and will void the warranty.

Motor Starter:

Adjust the thermal overload setting on the motor starter to match the full load amperage rating of the electric motor before wiring.

VFD:

VFDs purchased from Cook Mfg are preprogrammed. If you are not using a VFD from Cook Mfg, then the parameters of the VFD must be programmed to match the motors full load amperage rating and other parameters.

Wiring:

- Confirm the voltage and phase of power available at your facility matches the equipment specifications.
- Confirm the wire gauge and breaker sizes are correct per local and national codes.
- Using the provided wiring diagrams, make the wiring connections between the disconnect switch, motor control device, and electric motor.
- A wiring diagram can be found on the junction box cover or name plate of the electric motor.
- Select motors may have two additional red wires for a thermal overload. These wires are not used and should be capped individually using wire nuts.

Final Inspection:

- Check that all fasteners on the fan and mating ductwork have been properly tightened.
- Check that all guards are in place and secure.
- Check that the fan, ductwork, and surrounding area are free from any debris or tools that could be sucked into the fan. Debris sucked into the fan could cause injury or death.

Start Up:

- Momentarily apply power to the fan to check for proper rotation.
- Verify that the fan blade is spinning in the correct direction according to the rotation arrow on label. Refer to the wiring diagram if the rotation needs to be changed.
- If no issues are found, the fan should be in operation for no more than 16 hours before the first maintenance inspection is performed. The standard maintenance schedule can be used for all future maintenance planning.

Maintenance:

Hazards:

Verify that electrical service has been disconnected and locked out before performing any inspections or maintenance. All maintenance activities must be performed by trained and qualified personnel.

Schedule:

Item:	Interval:		
	Monthly:	Semi-Annually:	Annually:
Housing		X	
Blade		X	
Bearings	X		
Belts		X	
Motor			X
Ductwork		X	

Table 2 - Maintenance Schedule

Housing:

Inspect the fan housing for excessive buildup of particulates. Excessive buildup can cause premature failure of the blade and bearings. Remove built up particulates using a non-sparking scraper.

Blade:

Inspect the blade for excessive buildup of particulates. Excessive or uneven buildup can cause premature failure of the blade and bearings. Gently remove built up particulates using a non-sparking scraper and appropriate cleaner. The entire blade must be thoroughly cleaned to ensure the blade is balanced.

Bearings:

Grease bearings using a high quality NLGI Grade 2 grease. Ensure the grease is added slowly while spinning the fan by hand until clean grease can be seen exiting the bearing. Typically, only 1 pump of grease is needed per month.

Belts:

Belt Tension must be inspected and adjusted semiannually and after the first 16 hours of operation. Belts should be tightened just enough to prevent slipping. A tensiometer can also be used to measure belt tension. Replace belts immediately if signs of excessive or abnormal wear are visible.

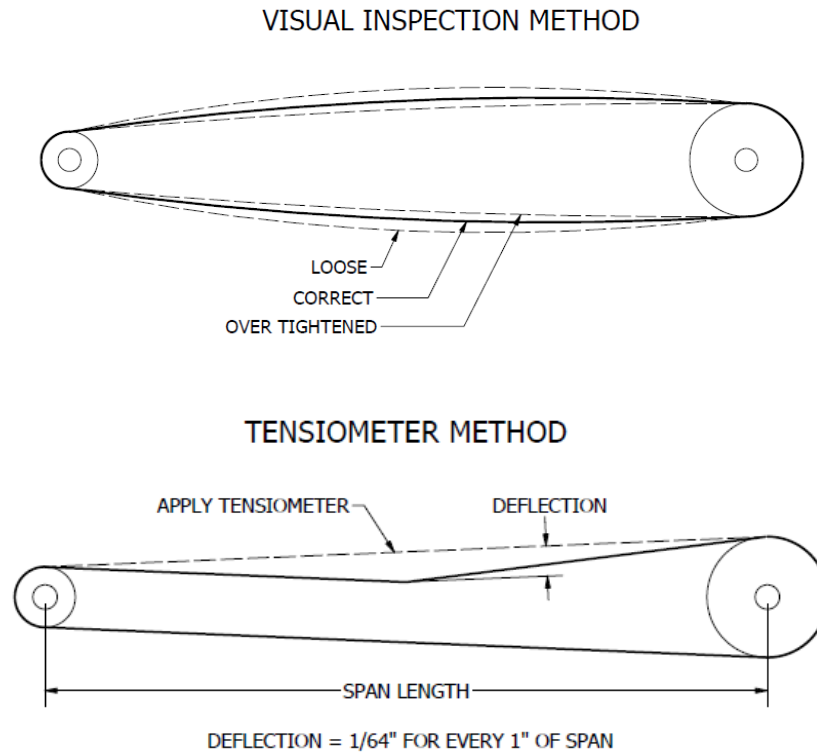


Figure 2 - Belt Tensioning Diagrams

Motor:

Remove any dust or grease from the exterior surface of the motor. Excessive buildup of dust can lead to an increased operating temperature and reduce the overall life of the motor.

Duct Work:

Inspect ductwork for excessive buildup of particulates. Excessive buildup can restrict airflow and presents a fire hazard. Remove any buildup using a non-sparking scraper and appropriate cleaner.

Bearing Replacement:

Disassembly:

Belts:

- Remove outer belt cover bolts and outer belt cover, shown in Figure 3.
- Loosen all four motor bracket bolts.
- Loosen all four jack bolts to slacken the belts.

Item No:	Description:
1	Motor Bracket Bolt
2	Outer Belt Cover Bolt
3	Bearing Bolts
4	Keyway
5	Inner Belt Cover Bolt
6	Fan Shaft Pulley, With Set Screw
7	Keyed Shaft
8	2-Bolt Pillow Block Bearing
9	Outer Belt Cover
10	Inner Belt Cover
11	Jack Bolts
12	Fan Bushing
13	Remote Grease Lines
14	Fan Bearing Cover
15	Fan Bearing Cover Bolts

Table 3 - Motor Area Parts List

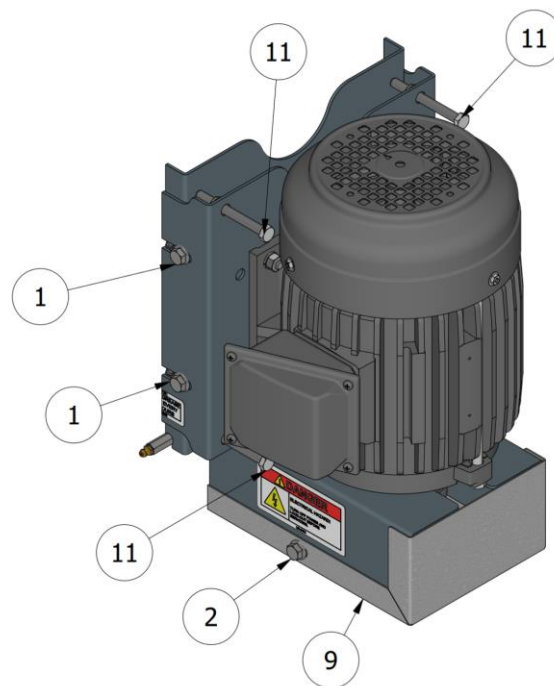


Figure 3 – Isolation View of Fan Motor Area

- Remove inner belt cover bolts and inner belt cover, shown in Figure 4.

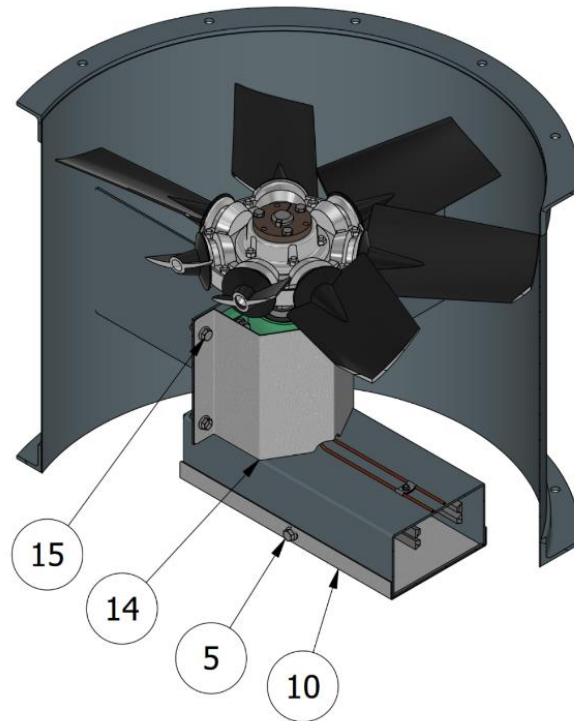


Figure 4 - Cutaway View of Fan Housing

Fan Blade Assembly & Bushing:

- Loosen the set screw for the keyway on the bushing.
- Remove the three bolts that secure the bushing to the fan blade assembly.
- Reinstall the three bolts in the threaded holes of the bushing and tighten by hand. Tighten the bolts in a circular pattern to remove the bushing from the fan blade assembly.
 - *NOTE: This step is only required for fans 18" in diameter and larger.*
- Remove the fan blade assembly, bushing, and keyway.

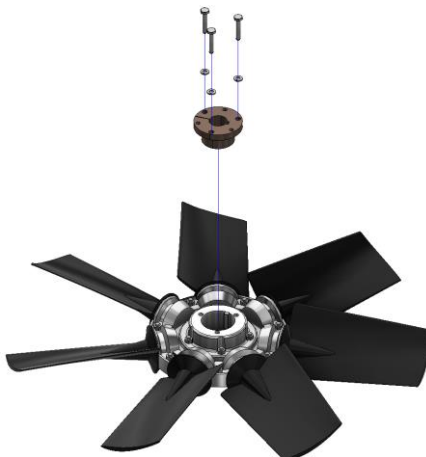


Figure 5 - Exploded View Showing Bushing Installation Into Fan Blade Assembly

Bearings & Grease Lines:

- Inside the fan housing, remove the bearing cover indicated in Figure 4.
- Loosen the set screw on the fan blade pulley in Figure 6.
- Remove the pulley and keyway from the shaft.

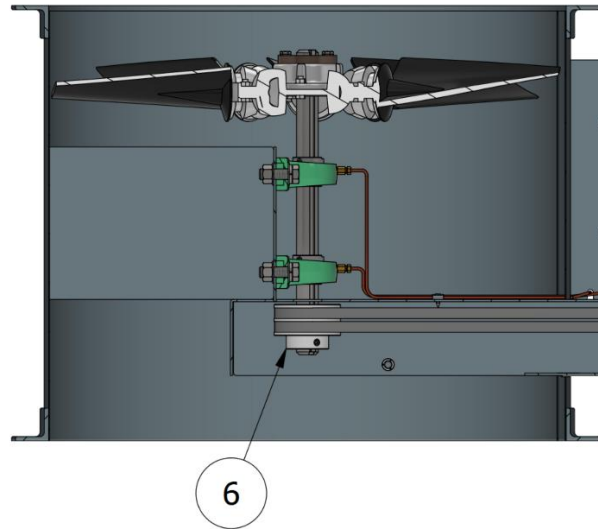


Figure 6 - Section View of Fan Housing

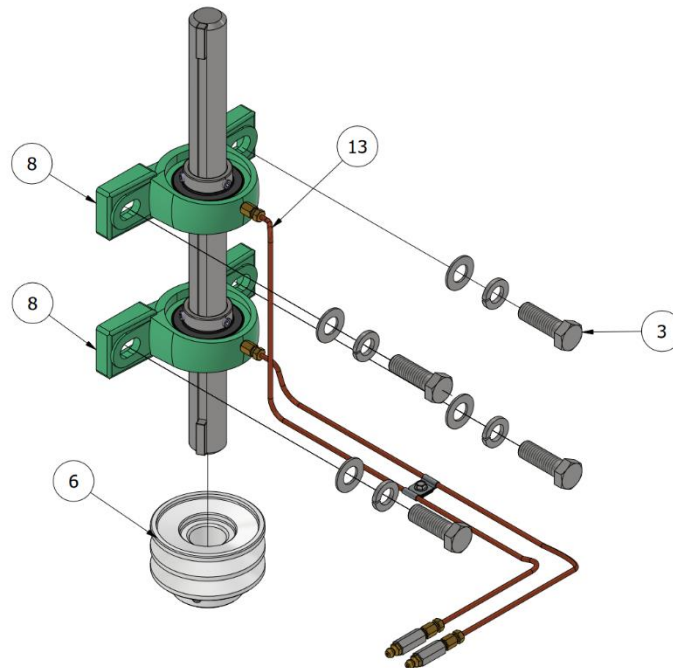


Figure 7 - Exploded View of Bearings with Grease Lines

- Disconnect remote grease lines, shown in Figure 7.
- Remove bolts, washers, and nuts from each bearing.
- Remove the bearings and shaft.

Reassembly:

Important Notes:

- All fasteners and set screws should be installed using medium strength Loctite.
- Make sure the shaft and keys are replaced along with the bearings.
- Do not overtighten the belts. The belts only need to be tight enough to prevent slippage.

Bearings & Grease Lines:

- Insert the new shaft through the bearings.
- Loosely attach the new bearings to the fan housing.
- Measure between the shaft and housing to ensure the shaft is parallel and centered.
- Make sure the shaft slides easily between the bearings before the bearings are fully torqued.
- Tighten bearing set screws and bearing bolts to proper torque indicated in the tables below.
- Re-attach the remote grease lines to the new bearings as shown in Figure 7 and fill with grease.

Bearing Bolt Torque Values:	
Diameter:	Torque (In*Lb):
3/8	276
1/2	684
5/8	1,344
3/4	2,400

Table 4 - Torque Values for Bearing Bolts

Set Screw Torque Values:			
Diameter:	Hex Key:	Torque (In*Lb):	
		Min:	Max:
#10	3/32	28	33
1/4	1/8	66	80
5/16	5/32	126	156
3/8	3/16	228	275

Table 5 - Torque Values for Set Screws

Fan Blade Assembly & Bushing:

- Place the fan blade assembly, bushing, and keyway together on the shaft.
- Tighten the three bolts on the bushing to secure the fan blade assembly to the shaft as shown in Figure 5.
- Torque the three bushing bolts and fan hub set screws to the proper torque indicated in the tables 5 and 6.

Bushing Bolt Torque Values:	
Type:	Torque (In*Lb):
SD	108
SH	96
H or HQ	96
P	192

Table 6 - Torque Values for Bushing Bolts

Belts:

- Install the fan blade pulley on the shaft as shown in Figure 7, making sure it is properly aligned with the motor pulley. Each pulley should have an 1/8" space next to the fan housing.
- Install the belts and tighten the jack screws, then tighten the motor mount bolts and re-attach the outer belt cover.
- Re-attach the inner belt cover.

Returning to Service:

- To restart the fan and resume normal operation, follow the Final Inspection and Start Up procedures on page 6 of this manual.

Warranty:

Cook Manufacturing (the Seller) warrants to the original end-user buyer (the Buyer) that the equipment manufactured by, and purchased from, the Seller (the Equipment), if properly installed, operated, and maintained in accordance with the Seller's manuals, and used under normal conditions, shall be free from defects in materials and workmanship for a period of one (1) year from the date the Equipment is shipped from the Seller's facility. The obligation of the Seller, and the Buyer's sole and exclusive remedy hereunder, shall be limited to one of the following, at the Seller's option:

- The repair or replacement of defective parts or components (collectively, the Parts) of the Equipment; provided, however, the Buyer shall be responsible for the payment of all transportation and labor costs associated with any such repair or replacement.
- In the event the Seller is unable to repair or replace the defective Parts, the Buyer shall be entitled to a refund of the cost of the Parts.

The Seller shall have no obligation under this Limited Warranty for ordinary wear and tear of the Equipment; if installation of the Equipment does not comply with the local, state and federal requirements or laws; or if the Equipment is modified by any other person or organization. The Seller makes no warranty of any kind whatsoever with respect to Parts which are manufactured or supplied by other persons or organizations (an OEM); provided, however, the Seller shall reasonably assist the Buyer in connection with warranties, if any, provided by an OEM.

Warranty Performance Procedure:

In the event the Buyer believes the Seller may be responsible for the performance of any warranty obligation, the Buyer must immediately send written notice of a claimed defect and must immediately refrain from any further use of the affected Equipment. No attempted repair of the claimed defect may be made without the prior written consent of the Seller. Before any Parts can be returned to the Seller, the Buyer must contact the Seller and request a Return Authorization. Upon the Buyer's receipt of the Return Authorization form, the Parts may be shipped, freight prepaid, to the facility designated on the Return Authorization. All Parts returned for repair, replacement, or refund (which refund may be made in the form of a credit to the Buyer's account), must be accompanied by the Return Authorization. All returned Parts

are subject to a fifteen percent (15%) handling charge. Parts manufactured or supplied by an OEM are subject to warranties, if any, provided by such OEMs; and repair or replacement of such Parts are subject to the approval of the OEM. The Buyer shall be responsible for the payment of any handling or restocking charges associated with OEM Parts.

Disclaimers of Warranties:

The warranties contained herein are expressly in lieu of any other expressed or implied warranties, or any other obligation on the part of the Seller, including without limitation, any implied warranty of merchantability or fitness for a particular purpose. Any models, drawings, specifications, affirmations of fact, promises, or other communications by the Seller with reference to the equipment or performance of the equipment are solely for the convenience of the Buyer and shall not in any way modify the express warranties and disclaimers set forth herein. The Buyer acknowledges it is purchasing the equipment solely based on the commitments for

the Seller as expressly set forth herein. No agents or other parties are authorized to make any warranties on behalf of the company or to assume for the company any other liability or obligation in connection with the equipment.

Consequential Damages:

The Seller shall not be liable for any incidental or consequential damages arising from the use of the equipment by the Buyer, the breach of any warranties, the failure to deliver, delay in delivery, delay on nonconforming condition, or for any breach of contract or duty between the Seller and the Buyer.

Limitation of Actions:

Any action resulting from the breach of any warranty contained herein by the Seller must be commenced within one (1) year after the cause of action accrues. In no event shall the Seller's total liability for any or all breaches of any warranty exceed the actual purchase price paid by the Buyer for the Equipment.