



AX High Performance Axial

Installation, Operating and Maintenance Manual



AX with Standard Long Casing



AX-V with Optional Vane Section



AX-S with Optional Short Casing



AX-U with Optional Roof Upblast

RECEIVING

Greenheck model AX fans are thoroughly inspected and test run at the factory. Greenheck personnel use state-of-the-art equipment to analyze items such as propeller alignment and balance. However, damage may occur during handling and shipping. Therefore, it is important that the unit be carefully inspected for visible and concealed damage before beginning installation. In addition, check to see that all accessory items have been received.

Report any damaged equipment to the shipper immediately!

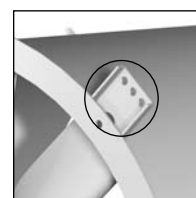
All axial fans are shipped on a skid or packaged to minimize damage during shipment. The transporting carrier has the responsibility for delivering all items in their original condition as received from Greenheck. The individual receiving the equipment is responsible for inspecting the unit for obvious or hidden damage, recording any damage on the bill of lading before acceptance and filing a claim (if required) with the final carrier.

HANDLING

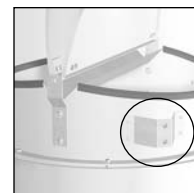
Fans should **NOT** be lifted by the motor shaft, motor housing, or fan accessories.



AX (Standard Long), AX-V (Vane Option), and AX-S (Short Casing Option) fans are to be lifted using a minimum of four (4) points on the fan housing or attach two suitable chains / straps around the entire fan housing, one near each duct flange. For flange mounted fans, attach suitably sized chains or lifting straps to two locations on the inlet and outlet flanges as shown. For fans with Universal Mounting brackets, use brackets for lifting connection points.



AX-U (Upblast Option) fans are to be lifted using the four (4) gussets located between the butterfly damper section of the fan and the exterior windband. A spreader bar is recommended to prevent damage to the damper section when lifting.



STORAGE - Indoor and Outdoor

Improper storage of fans waiting to be installed can significantly reduce the motor bearing life. When a fan is to be stored for a period of time, it must be protected from dirt and moisture. Use of a tarp to cover the unit will aid in keeping it clean and dry. Avoid using a black plastic tarp as it will promote condensation. Improper storage that results in damage to the fan will void the warranty.

Note: If the fan is stored in a clean dry location, the propeller and motor should be rotated by hand every 2-3 months to lubricate the motor bearings. For fans stored in a humid, dusty, or corrosive atmosphere, rotate the fan propeller every month to lubricate the motor bearings.

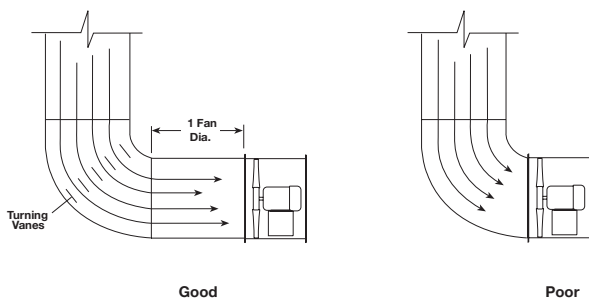
INSTALLATION

EFFECT OF INSTALLATION ON PERFORMANCE

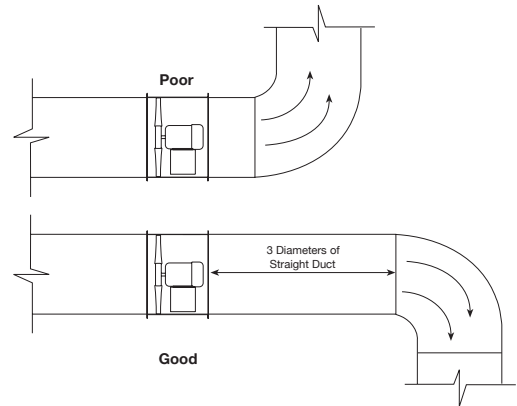
Any installation with inlet or discharge configurations that deviate from these recommendations may result in reduced fan performance. Restricted or unstable flow at the fan inlet can cause pre-rotation of incoming air or uneven loading of the fan propeller yielding large system losses and increased sound levels. Free discharge or turbulent flow in the discharge ductwork will also result in system effect losses.

The most common inlet and discharge conditions which affect fan performance are:

INLET DUCT TURNS



DISCHARGE DUCT TURNS



Installation of a duct turn or elbow too close to the fan inlet reduces fan performance because air is loaded unevenly into the fan prop. To achieve full fan performance there should be at least one to two fan diameters between the turn or elbow and the fan inlet.

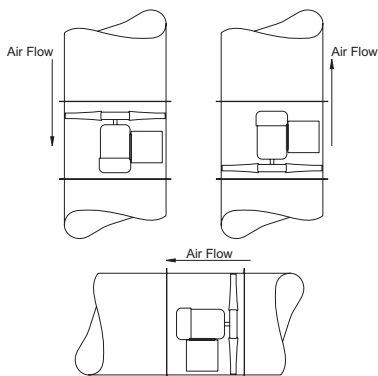
Fan performance is reduced when duct turns are made immediately off the fan discharge. To achieve cataloged fan performance, there should be at least three equivalent fan diameters of straight ductwork between the fan discharge and any duct turns.

TYPICAL INSTALLATIONS

The examples shown below are common installations of the different housing options with and without optional Universal Mounting Brackets. Before beginning installations, reference the air flow direction as indicated by the direction decal attached to the fan. Note that air flow for AX units with straightening vanes is opposite of the standard AX long casing design.



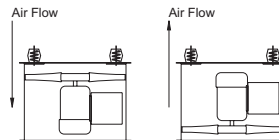
Units with Flange Mounting



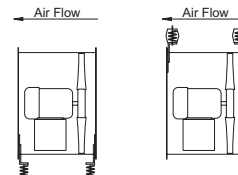
Upblast, Downblast, or Horizontal

Units with Universal Mounting Brackets (Optional)

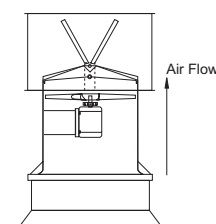
Vertical - Ceiling Mount with Isolators, Downblast or Upblast



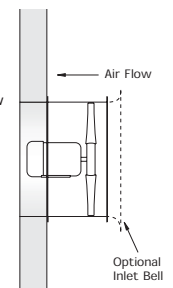
Horizontal - Floor or Ceiling with Isolators



Roof Upblast on a roof curb



Wall Mounted (Short Case)



OPERATION AND UNIT START-UP

ELECTRICAL CONNECTIONS

Before electrical connections are made, the supply voltage, phase and ampere capacity must be checked for compatibility with the fan motor. In addition, the supply wiring must be properly fused and conform to local and national electrical codes. The supply wires are then connected to an **optional** safety disconnect switch, to the **optional** wiring pigtail, or directly to the motor junction box.

PRE-START UP CHECKS

1. Check all fasteners for tightness. Fasteners may come loose during transit or handling at the jobsite. This includes motor bolts, mounting brackets, and bushing bolts attaching the propeller to the motor shaft.
2. Propeller rotation should be in the same direction as the rotation decal affixed to the unit. For 3-phase installations, fan rotation can be reversed by simply interchanging any two of the three electrical leads. For single phase installations, follow the wiring diagram located on the motor.



Propeller Rotation Decal

PERFORMANCE ADJUSTMENTS

FIELD PERFORMANCE ADJUSTMENTS

The performance of an AX fan can be adjusted through the use of a Variable Speed Drive (VFD or ASD) or adjusting the fan pitch. Both can be effectively used for final air balancing. NOTE that any change, increase or decrease in fan speed (RPM) or blade pitch can represent a substantial increase in power required from the motor. Check motor load amperage and compare to nameplate rating when changing the fan speed or blade pitch.

ADJUSTING PERFORMANCE WITH A VARIABLE FREQUENCY DRIVE

Before wiring a VFD, determine that the motor is compatible with this type of equipment. Connecting a VFD to a non-compatible motor may reduce the life of the motor. Additionally, it is important to properly ground fans being wired with a VFD. For more information on these subjects, refer to Greenheck document "Are Bearing Currents Causing Your Motor Failures?" located at www.greenheck.com. Click on Application Info, then on Product Application Articles, and use the keyword "VFD". Greenheck is not responsible for improper wiring of a VFD or for potential motor damage as a result of operating a fan over its maximum operating frequency.

ADJUSTING PERFORMANCE THROUGH BLADE PITCH ADJUSTMENTS

The blade pitch can be adjusted without removing the propeller from the fan casing. Steps to adjust the blade pitch are as follows:

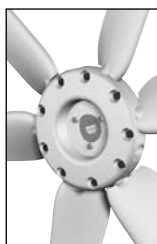
1. Determine the new blade pitch required with your local Greenheck representative. Verify that the motor has sufficient capacity to handle the new power requirements.
2. Disconnect and lock out all power to the fan to prevent accidental start-up.
3. Gain access to the propeller side of the fan. This may require removing the fan from the existing duct system or dismantling ductwork to gain access.
4. Loosen the blades to the point where they can be rotated in the hub. Hub and blade fastening vary by fan size. Hub styles and bolt torque requirements are shown below. Do NOT pound on the blades to adjust the pitch. They should be snug, but movable by hand.
5. Use the blade pitch protractor found on Greenheck's web site (www.greenheck.com) to adjust the pitch. Follow the directions stated on the guide for determining blade pitch.
6. Adjust one blade to the desired pitch angle and remove the protractor sheet.
7. Use a marker to trace the profile of the blade on the fan housing.
8. Adjust the remaining blades to the traced profile.
9. Retighten the hub to the torque specs detailed below per hub size.
10. Reinstall the fan or any duct pieces that were removed.
11. Review the Operation and Start-up procedures listed earlier in this manual.
12. After start-up, make a final check of the fan amps to ensure the motor is not overloaded.

TORQUE SPECIFICATIONS FOR BUSHINGS AND PROPELLER BOLTS



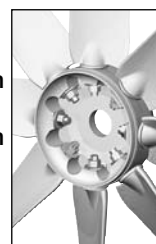
HUB SIZE: 160 mm
 Bushing bolts -
 9 ft-lb / 12.2 N-m
 Propeller bolts -
 7 ft-lb / 9.5 N-m

HUB SIZE: 190 mm
 Bushing bolts -
 16 ft-lb / 21.7 N-m
 Propeller bolts -
 7 ft-lb / 9.5 N-m



HUB SIZE: 275 mm
 Bushing bolts -
 16 ft-lb / 21.7 N-m
 Propeller bolts -
 21 ft-lb / 28.5 N-m

HUB SIZE: 400 mm
 Bushing bolts -
 27 ft-lb / 36.6 N-m
 Propeller bolts -
 50 ft-lb / 67.8 N-m



HUB SIZE: 533 mm
 Bushing bolts -
 40 ft-lb / 54.2 N-m
 Blade Nuts -
 125 ft-lb / 169.5 N-m

MAINTENANCE

Once the unit has been put into operation, a routine maintenance schedule should be set up to accomplish the following:

1. Lubrication of motor.
2. Propeller, housing, and bolts on the entire fan should be checked for tightness.
3. Any dirt accumulation on the propeller or in the housing should be removed to prevent unbalance and possible damage.
4. Inspection of fan propeller and housing looking for fatigue, corrosion, or wear.

When performing any service to the fan, disconnect the electrical supply and secure fan propeller.

MOTORS

Motor maintenance is generally limited to cleaning and lubrication. Cleaning should be limited to exterior surfaces only. Removing dust and grease buildup on the motor housing assists proper motor cooling. Never wash-down motor with high pressure spray.

Greasing of motors is only intended when fittings are provided. Many fractional motors are permanently lubricated for life and require no further lubrication. Motors supplied with grease fittings should be greased in accordance with the motor manufacturer's recommendations.

FASTENERS AND SET SCREWS


A periodic inspection should include checking all fasteners and bolts for tightness. Particular attention should be paid to the bushing attaching the propeller to the motor shaft and the motor to its mounting fixture.

REMOVAL OF DUST AND DIRT

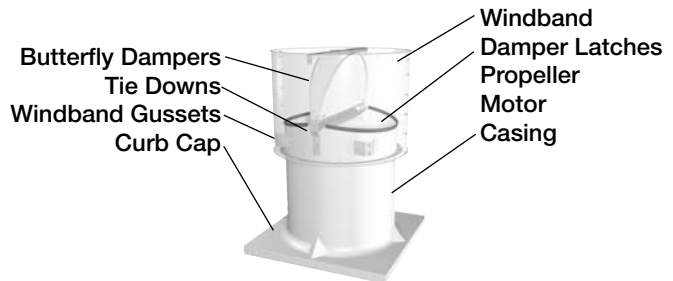
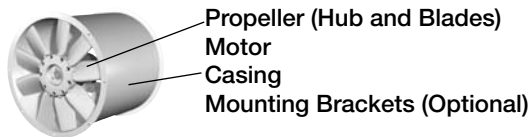
Dirt clogs cooling openings on the motor housing, contaminates bearing lubricant, and collects on the propeller causing severe imbalance if left unchecked. The exterior surface of the motor and propeller should be thoroughly cleaned periodically. Use caution and do not allow water or solvents to enter the motor. Under no circumstances should motors be sprayed with steam or water.

PARTS LIST

Each fan bears a manufacturer's nameplate with model number and serial number embossed. This information, in addition to the shown parts diagram, will assist the local Greenheck representative and the factory in providing service and replacement parts.

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|  <small>P.O. BOX 410 SCHOFIELD, WISCONSIN 54476-0410 PH. 715-359-6171 www.greenheck.com</small> | |
| MODEL | <input type="text"/> |
| S/N | <input type="text"/> |
| MARK | <input type="text"/> |

Tags are mounted in an area which is clearly visible, usually near the fan outlet. The exact tag location may differ with fan model and size.



Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid.

Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

Due to continuing research, Greenheck reserves the right to change specifications without notice.

