# High Performance Axial Fans Model AX

High Efficiencies 
Low Sound





December 2023

AIR

## **High Performance Axial Fans**



Greenheck's high performance axial fans, Model AX, are direct driven axials designed for inline air ventilation in commercial or industrial buildings. The casing design and construction are well suited to indoor or outdoor applications and can be easily installed in ducted or non-ducted systems. The AX is designed to reduce operating costs with improved efficiency. Additionally, the AX blade design offers inherently lower sound levels than other axial fans.

## Typical Ventilation Applications include:

- Supply and return fans for air handling equipment
- Continuous duty operation at 110°F
- Emergency smoke and heat exhaust
- Stairwell pressurization
- Parking garage and storage facility exhaust
- Industrial process ventilation
- Tunnel ventilation



AX 100, 200 AX 300

Certified data may be found in Greenheck's Computer Aided Product Selection program (CAPS<sup>®</sup>).

## FEI - Fan Energy Index

## Enjoy Greenheck's extraordinary service, before, during and after the sale.

Greenheck offers added value to our wide selection of top performing, energy-efficient products by providing several unique service programs.



- Our Quick Delivery program ensures shipment of in-stock products within 24 hours of placing your order. Our Quick Build made-to-order products are manufactured in 1-3-5-10-15-20 or 25-day production cycles, depending upon its complexity.
- eCAPS<sup>®</sup> online selection guides you to choose the best value products for your building projects. eCAPS<sup>®</sup> includes fan, louver, make-up air, energy recovery preconditioner, and dedicated outdoor air system (DOAS) selections, as well as a damper guide and toolbox.



- Greenheck's free Computer Aided Product Selection program CAPS<sup>®</sup>, rated by many as the best in the industry, helps you conveniently and efficiently select the right products for the challenge at hand.
- Our 3D service allows you to download, at no charge, easy-to-use AutoDesk<sup>®</sup> Revit<sup>®</sup> 3D drawings for many of our ventilation products.

Find out more about these special services at greenheck.com



The AX is available in 14 sizes that cover a wide range of volumetric flow and pressure conditions. Additionally, the blade pitch is field adjustable to accommodate system changes.

#### **Capacity Ranges:**

Volumes up to 125,000 cfm (212,400 m<sup>3</sup>/hr) and external static pressures to 5 in. wg (1,250 Pa)

## **Model Comparison**



	AX								
Series	100	200	300						
Volume Range	0 - 10,000 cfm (0 - 17,000 m³/hr)	10,000 - 65,000 cfm (17,000 - 110,400 m³/hr)	500 - 125,000 cfm (850 - 212,400 m³/hr)						
Static Pressure	Up to 1.5 in. wg <i>(370 Pa)</i>	Up to 2.5 in. wg <i>(620 Pa)</i>	Up to 5 in. wg <i>(1,250 Pa)</i>						
Construction	Bolted	Welded	Welded						
Mounting	Universal Mounting	Universal or Flange Mounting	Universal or Flange Mounting						
Environment	Indoor / Outdoor	Indoor / Outdoor	Indoor / Outdoor						
Roof Upblast		$\checkmark$	$\checkmark$						
UL 705 - Electrical	$\checkmark$	$\checkmark$	$\checkmark$						
UL Emergency Smoke Evacuation		$\checkmark$	$\checkmark$						
Spark Resistance		В							
Roof Supply			$\checkmark$						
Reversible Airflow			$\checkmark$						

= Optional



AX 100



AX 200



AX 300



The AX is available in a variety of casing configurations to provide solutions for many different applications and design requirements.

## AX Long Casing (Standard)

The long cased housing is designed for ducted or plenum type applications. The all welded long-casing completely covers the motor and propeller assembly. This design offers numerous mounting options including horizontal or vertical orientations for either ceiling hung or base mounting.

## AX Vane Section (300)

The long cased housing with vane section further improves the efficiency of the standard AX model. The bolt-on section includes aerodynamically shaped vanes that convert the kinetic energy of swirling air into useful static pressure. This design will improve the overall fan efficiency. This is an excellent option for higher pressure ducted applications.

## **AX Reversible (300)**

The reversible fan is designed for clean air applications, as well as smoke exhaust. Inline or hooded roof-mounted construction allows for flexible design options. Most common in stairwell pressurization applications.

## AX Roof Supply (300)

The roof supply fan is designed for clean supply air intake. Standard construction includes a heavy-gauge spun inlet bell, a heavy-gauge, precision roll formed steel hood with interlocking edges for a weather-resistant seal and a rigid, welded curb cap for easy installation. A complete line of roof curbs is available for mounting to a roof deck.

## AX Roof Upblast (200, 300)

The roof upblast fan is designed for roof-mounted ventilation. Standard construction includes a heavy-gauge spun curb cap to reduce inlet losses, a butterfly damper section for backflow prevention, and a windband section to protect the butterfly dampers from debris. A complete line of roof curbs is available for mounting to a roof deck.







## **Value Added Features**



#### **High Performance Propeller**

The AX blade shape and hub are designed to move high volumes of air with less power to save on long-term energy costs.



## Extensive R&D and Performance Testing Program



#### **AX 100 Propellers**

AX-100 series fans utilize a low cost, optimized performance propeller with no stall/surge region. This feature dramatically expands the operating range for low CFM applications. The prop construction consists of a stamped galvanized steel hub and stamped aluminum blade construction for light weight and corrosion resistance.

#### AX 200 and 300 Series Blades

Tight tolerances between the blades and casing improve overall efficiency. This improved efficiency in turn reduces the overall sound levels, but the AX is even quieter as a result of the wide blade shape and unique blade spacing. The asymmetrical blade locations reduce the blade pass frequency tones while generating a smoother sound spectrum.

### AX 200 and 300 Series Hubs

The choice of five different hub diameters, along with variations in blade quantities, ensures that the most economical air performance can be achieved. In addition, during the design process, close attention was paid to the "hub to tip" ratios. This is a comparison of the hub diameter to the "tip to tip" dimension of the blades. Different choices of hub-to-tip ratios further optimize fan performance and provide a cost-effective solution by not oversizing a hub to produce required volumes and pressures. The hubs are constructed from cast aluminum and use a taper lock bushing to secure the hub to the motor shaft.

	Available Prop Configurations										
Fan Series	100	2	00	300							
Pitch	Fixed	Fiz	ked			Adjustab	le				
Hub Size	Integrated	190	275	160	190	275	400	533			
Blades	3, 4	6	6	4 or 6	4 or 6	6 or 9	6 or 9	8 or 12			
31	<b>X</b> <sup>4</sup>			Х							
36	<b>X</b> <sup>4</sup>			Х							
41	<b>X</b> <sup>3</sup>			Х	Х						
47	X <sup>4</sup>			Х	Х						
54				Х	Х	Х					
63	<b>X</b> <sup>3</sup>			Х	Х	Х					
72	X <sup>4</sup>				Х	Х					
80		Х			Х	Х	Х				
90		Х				Х	Х				
103		Х				Х	Х				
113		Х				Х	Х	Х			
123		Х					Х	Х			
140			Х				Х	Х			
160			Х				Х	Х			





## **Construction Features**



		100	200	300
Housing Finish	The AX 100 series fans come standard with mill finish galvanized steel. The AX 200/300 series fans come standard with Permatector™ coating. Greenheck's Permatector™ coating is an electrostatically applied thermosetting polyester urethane. Permatector coatings provide excellent corrosion characteristics for general indoor and outdoor applications.	Galv.	Painted	Painted
Extended Wiring	Electric wiring leads from the motor are brought to the outside of the unit's exterior for easy wiring connection.	Std.	Std.	Std.
Inspection Door	Quick opening inspection door provides access through the fan tube for inspection of the propeller and motor.		$\checkmark$	$\checkmark$
Inspection Section	Easily removable length of duct and recommended to improve serviceability. Inspection sections are provided with a full diameter removable access panel.		$\checkmark$	$\checkmark$
Flanges	Integral inlet and outlet flanges with mounting holes are provided for airtight ductwork connections.	Std.	Std.	Std.
Disconnect Switches	Toggle-type and heavy-duty disconnect switches for positive electrical shut-off and safety when servicing fans.	$\checkmark$	$\checkmark$	$\checkmark$
Inlet and Outlet Guards	Removable inlet and outlet guards provide protection for personnel and equipment in ducted or non-ducted installations.	$\checkmark$	$\checkmark$	$\checkmark$
Isolators	Base mount and hanging isolators are available in either neoprene or spring mounts.	$\checkmark$	$\checkmark$	$\checkmark$
Special Coatings	Special coatings are available for protective purposes.		$\checkmark$	$\checkmark$

= Optional

## **Emergency Smoke Evacuation**

The AX model was tested and rated for design time and temperatures used in emergency heat and smoke exhaust applications. Consult your Greenheck representative for time and temperature combinations other than those listed.



Model AX is available with UL/cUL Listing for Power Ventilators for Smoke Control Systems, File no. MH17511

	Operating Temperature		Operating Time Temperature Duration		Time Duration		
Series	°C	°F	Hours	Comments			
200, 300	150	302	5				
	250	482	2	Per British Spec 7346			
300	300	572	1				
	260	260 500		Per Industrial Risk Insurers (North America)			

## **Optional Accessories**





The AX is available with optional accessories to improve the ease of installation and provide safety during operation. Accessories supplied by Greenheck conform to our high standards of quality.

Universal Mounting Brackets allow for field rotation of the AX from horizontal ceiling or base mount and vertical ceiling or base mount applications. The brackets also provide an attachment point for any vibration isolation devices.

Companion Inlet and Outlet Flanges are available to aid the connection of the fan casing flange to ductwork. Companion flanges are prepunched to match the bolt hole dimensions.

Inlet Bells (series 200 and 300 only) minimize entry losses into the fan from free (non-ducted) inlet conditions to ensure rated performance. Inlet bell guards are supplied to prevent accidental contact with the fan propeller.

Inlet and Outlet Guards protect personnel and equipment in ducted or nonducted installations. Guards are removable for routine fan maintenance.

Safety Disconnect Switches are available for positive electrical shut-off at the fan. Switches can be factory wired or shipped loose for mounting at the jobsite. Choices include:

- NEMA-3R / IP32 Rainproof (outdoor)
- NEMA-4 / IP66 Watertight (outdoor)
- NEMA-4X / IP65 Corrosive (outdoor)
- NEMA-12

**Isolators**, both base mount and hanging style, are available in either neoprene or spring mounts. The isolators are furnished in sets of four and are sized to match the total weight of each fan, motor and accessory combination.



## **Protective Coatings**



Greenheck offers a wide variety of protective coatings suitable for corrosive applications on the **AX 200** and **300**. All coatings are electrostatically-applied baked powders that offer a durable, long lasting finish. For more information on our complete offering of coatings, visit www.greenheck.com and navigate to Resources/Library/Application-Articles. Search for Straight Talk on Protective and Aesthetic Coatings for Commercial/Industrial Fans.

Chemical Resistance Ratings										
Chemical	Bleach	Sulfuric Acid (10%)	HCI (10%)	MEK	Chlorine (0.1%)	NaOH (20%)				
Permatector	0	1	2	2	0	—				
Hi-Pro Polyester	0	0	0	1	0	—				
Hi-Pro-Z	0	0	0	1	0	1				
0 - No effect RATING DESCRIPTIONS 3 - Significant pitting, cratering, swelling, or erosion with obvious surface deterioration										

#### **Two-Coat Advantage**

For corrosive environments, use Greenheck's Hi-Pro-Z two-coat coating technology. Test data demonstrates our two-coat paint system offers four times the corrosion resistance of other coatings commonly available within the fan industry.



## **Performance Tested**

When selecting a powder coating finish for heavy-gauge welded steel fans, critical information such as environment, moisture, exposure, abrasives, and chemicals should be considered.

Powder coatings are the best choice for most extreme applications. Major advantages over most vendor-applied liquid coatings include:

<ul><li>Superior finish with uniform coverage and thickness</li><li>A better coating provides better protection</li></ul>					E	nviroi	nment	CLES S		J_
<ul><li>The process is environmentally friendly</li><li>Unequaled value</li></ul>				AN AIR	ASTAL	EMICAL*	REME WEATH	ASIVE PARTI	1-10	A
	Coatings	Color	Coating Specifications	GE	00	풍	EXT	ABF	SUN	1000
oat ss	Permatector™ Standard coating for steel products in both indoor and outdoor applications		Thickness: 2.0 - 3.0 mils Polyester urethane powder coating	x					x	
One C Proce	<b>Hi-Pro Polyester</b> Formulated for exterior durability, color and gloss retention. Excellent for chemical applications.	oncrete Grey RAL 7023	Thickness: 2.0 - 3.0 mils High performance polyester urethane powder coating	x		x			x	
Two Coat Process	<b>Hi-Pro-Z</b> Two-coat powder paint coating is resistant to saltwater, chemical fumes and moisture in corrosive environments	ŏ	Thickness: 4.0 - 6.0 mils Hi-Pro Polyester topcoat with epoxy basecoat	x	X	X	X	X	x	1111

Note: Hi-Pro-Z is not available on aluminum.

\*Chemical Resistant Rating Above

## **Roof Mounting**



## **Roof Curbs**

Roof curbs are available for mounting the fan to the roof.

#### GPFHL (Heavy Load) (series 300 only)

14-gauge galvanized steel with internal vertical support members and a 5-inch flashing flange. Available up to 24 inches in height.

## Series 200 Roof Curbs

GPF
GPFP
GPFR
GPI
GPIP
GPIR
GPR
GPS



## **Installation Flexibility and Fan Vibration Isolation**

The compact design of the AX helps when fitting into tight spaces and provides flexibility during design. In addition, integral connection flanges and optional Universal Mounting brackets provide additional flexibility to accommodate mounting location changes for last minute modifications. Universal Mounting brackets also provide a connection point for any isolation.



#### **Propeller Balancing and Fan Testing**

All propellers are statically and dynamically balanced to assure vibration-free operation. In addition, all completely assembled fans are test run at the factory with motor amp measurements taken to ensure proper operation.

#### **Motors**

Motors are available with NEMA (TEAO, TEFC, or TENV) designs. NEMA motors use across the line starting with options for VFD compatibility. Motors using 50 Hz power have a 1.0 service factor, while 60 Hz power have a 1.15 service factor. Design and construction options for motors

include increased thermal insulation, overload protection and extended motor leads. The AX is available with the UL/cUL 705 (Underwriters Laboratory) listing on a wide variety of 50 and 60 Hz motors. This listing ensures the use of UL approved electrical components.





Vertical Ceiling Hung

## **Electronics and Controls**



## Variable Frequency Drives (VFD)

Greenheck provided VFDs get systems up and running quickly. Each drive is sized, configured, and programmed for operation at the specified performance.

#### Easy to use touch pad allowing for speed adjustment

- Simple menu screen to scroll through
- Quick and easy system balancing
- No time-consuming or additional costs for belt drive sheave changes

#### Advantages of Greenheck supplied VFD

- VFD factory sized for amperage by fan-selected horsepower and operating voltage
- Pre-programmed at the factory
  - $\cdot$  Personalized menu structure for the most commonly adjusted items
  - · Motor information (HP, voltage, line Hz, nominal speed)
  - $\cdot$  Maximum Hz limited to that of motor hp, or by fan construction
  - $\cdot$  Programmed PID loop for operation with constant pressure or volume, if option selected, to maintain set point
  - $\cdot$  Quick and easy to understand installation guide and troubleshooting video
  - $\cdot$  Ships separate for choice between remote mounting for easy access or near the fan as needed
- · Motor configured and compatible for use with a VFD

Best value choice with multiple VFDs available based on location and application

Installation Location	Enclosure Rating	Overload Protection Available	External Communication Available	Additional Control Options	Factory Pre- Programmed	Touch Screen Speed Control
Indoor	NEMA 1	$\checkmark$	$\checkmark$	Constant Pressure or	Yes	Yes
Indoor / Outdoor	NEMA 3R or 4X	$\checkmark$	$\checkmark$	Constant Volume (Indoor and Indoor/Outdoor)	Yes	Yes

= Optional

## **Vari-Green<sup>®</sup> Electronically Commutated (EC) Motors**

The Greenheck Vari-Green<sup>®</sup> motor is an electronically commutated (EC) motor that operates on single or three-phase AC power input and internally converts it to DC power, providing better speed control capabilities (up to an 80% turndown) and higher efficiencies than standard motors. The Vari-Green motor blends technology, controllability and energy efficiency in a low maintenance package that has changed the way the industry designs, specifies and operates air movement equipment. Depending on power rating, Vari-Green motors are available in both single and three-phase with either a dial-mounted potentiometer (speed control) or wired to accept a 0-10 VDC control signal from an external source.







## **Service Disconnects**



Toggle type and heavy-duty disconnect switches are available for positive electrical shut-off and safety when servicing fans. The following switches are available to meet individual electrical requirements and can be factory mounted or shipped loose for field mounting.



Service Disconnect Features and Options										
Enclosure NEMA-3R NEMA-4, NEMA-4X, NEMA-12										
Туре	Toggle	Toggle Heavy-Duty			Toggle	Heavy	-Duty			
Protection	None	None	Fused	None	Thermal Overload	None	Fused			



## **AX Specifications**

Inline fans shall be direct driven in AMCA arrangement 4 propeller secured to the motor shaft.

The fan housing to be designed with integral punched inlet and outlet flanges to prevent air leakage. The housing shall be constructed of rolled steel with a continuous seam weld. Motor support framework to be constructed of structural steel that is suitable to handle the weights of the motor and propeller. The propeller shall be both statically and dynamically balanced.

Fan performance shall be based on tests conducted in accordance to AMCA 210 (meets BS 848-1), licensed to bear the AMCA Air Performance Seal in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings Program. All published AX sound data shall be tested in accordance to AMCA 300.

Fan shall be model AX as manufactured by Greenheck Fan Corporation of Schofield, Wisconsin, USA.





## **Manufactured in North America**

Model AX fans are built in one of three manufacturing locations. Multiple manufacturing locations enable us to build fans and get them to you, our customer, faster.

## **Our Commitment**

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.













