

## Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with these instructions will result in voiding of the product warranty and may result in personal injury and/or property damage.

### Condenser Fans

Designed to keep air moving to help regulate temperature and provide proper ventilation for your equipment.

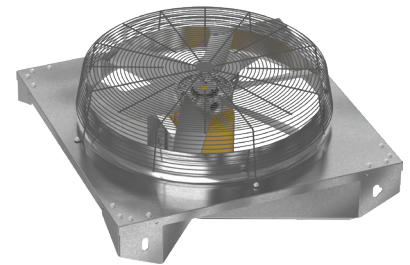
#### Model ARC

The ARC model features a single direct drive motor propeller assembly and a 7-blade high efficiency propeller to ensure maximum air performance. Galvanized steel construction provides high resistance to corrosion. Tested under BV3 Vibration to meet AHU structural designs. UL 61800 rated electronically commutated external rotor motor tested under UL-705 Water Spray Testing achieved IP54 rating. Painted steel wire guard tested according to UL-705, section 6 guideline.



#### Model AER-Condenser Variant

The AER condenser fan variant offers enhanced motor protections up to 60°C ambient airstream temperatures and up to IP55 water ingress protection. The AER features galvanized steel construction for high resistance to corrosion and a choice between a cast aluminum or fabricated steel propellers. Painted steel wire guard tested according to UL-705, section 6 guidelines.



### General Safety Information

Only qualified personnel should install this fan. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. If more information is needed, contact a licensed professional engineer before moving forward.

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electric Code (CEC) in Canada.
2. The rotation of the propeller is critical. It must be free to rotate without striking or rubbing any stationary objects.
3. Motor must be securely and adequately grounded.
4. Do not spin fan propeller faster than max cataloged fan RPM. Adjustments to fan speed significantly affects motor load. If the fan RPM is changed, the motor current should be checked to make sure it is not exceeding the motor nameplate amps.

5. Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces or chemicals. Replace cord immediately if damaged.
6. Verify that the power source is compatible with the equipment.

#### WARNING

To reduce the risk of fire, electrical shock, or injury to persons, observe the following:

- a. Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
- b. Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting the means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

#### DANGER

Do not place body parts or objects in fan or motor openings while motor is connected to the power source.

## AVERTISSEMENT

Pour réduire le risque d'incendie, de choc électrique ou de blessure corporelle, respecter ce qui suit :

- a. Utiliser cet appareil exclusivement comme prévu par le fabricant. En cas de questions, communiquer avec le fabricant.
- b. Avant tout entretien ou nettoyage de l'appareil, couper l'alimentation sur le tableau de commande et verrouiller le dispositif de sectionnement pour empêcher toute mise sous tension accidentelle. Si le dispositif de sectionnement ne peut pas être verrouillé, attacher un moyen de mise en garde bien visible, tel qu'un panneau, au tableau de commande.

## DANGER

Ne pas placer de parties du corps ni d'objets dans les ouvertures de la tourelle ou du moteur si l'appareil est raccordé à une source de courant.

## Receiving

Upon receiving the product check to ensure all items are accounted for by referencing the delivery receipt or packing list. Inspect each crate or carton for shipping damage before accepting delivery. Alert the carrier of any damage detected. The customer will make a notation of damage (or shortage of items) on the delivery receipt and all copies of the bill of lading which is countersigned by the delivering carrier. If damaged, immediately contact your local representative. Any physical damage to the unit after acceptance is not the responsibility of the manufacturer.

## Unpacking

Verify that all required parts and the correct quantity of each item have been received. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts. Due to availability of transportation and truck space all items for the unit may not be shipped together. Confirmation of shipment(s) must be limited to only items on the bill of lading.

## Storage

Fans are protected against damage during shipment. If the unit cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the unit during storage. The user assumes responsibility of the fan and accessories while in storage. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user.

## Storage Environment

The ideal environment for the storage of fans and accessories is indoors, above grade, in a low humidity atmosphere which is sealed to prevent the entry of blowing dust, rain or snow. Temperatures should be evenly maintained between 30° to 110°F (-1° to 43°C) (wide temperature swings may cause condensation

and "sweating" of metal parts). All accessories must be stored indoors in a clean, dry atmosphere.

Remove any accumulations of dirt, water, ice or snow and wipe dry before moving to indoor storage. To dry parts and packages, use a portable electric heater to get rid of any moisture buildup. Leave coverings loose to permit air circulation and to allow for periodic inspection.

The unit should be stored at least 3-1/2 inches (89 mm) off the floor on wooden blocks covered with moisture proof paper or polyethylene sheathing. Aisles between parts and along all walls should be provided to permit air circulation and space for inspection.

Fans designed for outdoor applications may be stored outdoors, if absolutely necessary. Roads or aisles for portable cranes and hauling equipment are needed. The fan should be placed on a level surface to prevent water from leaking into the fan. The fan should be elevated on an adequate number of wooden blocks so that it is above water and snow levels and has enough blocking to prevent it from settling into soft ground. Locate parts far enough apart to permit air circulation, sunlight and space for periodic inspection. To minimize water accumulation, place all fan parts on blocking supports so that rain water will run off. Do not cover parts with plastic film or tarps as these cause condensation of moisture from the air passing through heating and cooling cycles. Fan propellers should be blocked to prevent spinning caused by strong winds.

## Inspection and Maintenance During Storage

While in storage, inspect fans once per month. Keep a record of inspection and maintenance performed.

If moisture or dirt accumulations are found on parts, the source should be located and eliminated. At each inspection, rotate the propeller by hand ten to fifteen revolutions to distribute lubricant in motor.

## Removing From Storage

As fans are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion until the fan equipment goes into operation.

Prior to fully assembling and installing the fan inspect the fan assembly to make sure it is in working order.

1. Check all fasteners, set screws on the fan, propeller, bearings, drive, motor base and accessories for tightness.
2. Rotate the propeller by hand and assure no parts are rubbing.

## Pre-Installation Checks

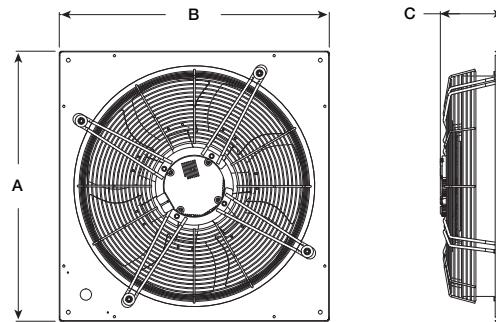
1. Check motor voltage and amperage rating for compatibility with electrical supply. Supply wiring must be properly fused and conform to local and national codes.
2. Motor load amperage must be checked and compared to nameplate rating to avoid serious damage to motor when speed is increased.

## Dimensional Data and Specifications

### Model ARC

Model Variant	Propeller Dia.	Motor Size (hp)	Motor Phase	Motor Voltage	Junction Box	A	B	C	Fan Weight
ARC-24-02-0720-VG1	24	1	1	208/230	Yes	30	30	7	59
ARC-24-02-0720-VG2	24	1	1	460	Yes	30	30	7	59
ARC-24-02-0720-VG3	24	1	1	208/230	No	30	30	7	57
ARC-24-02-0720-VG4	24	1	1	460	No	30	30	7	57

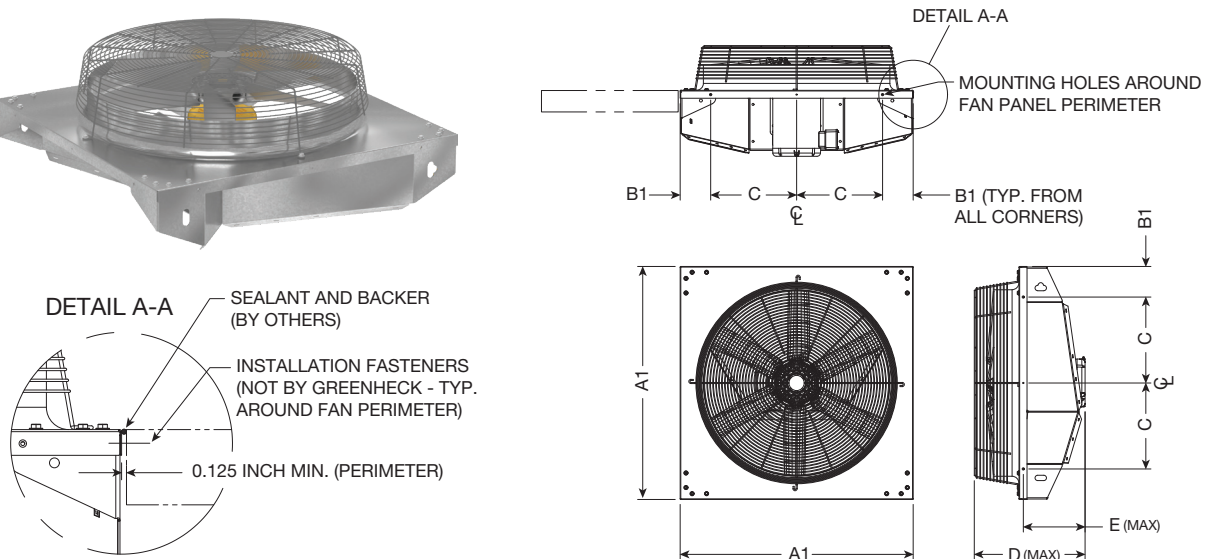
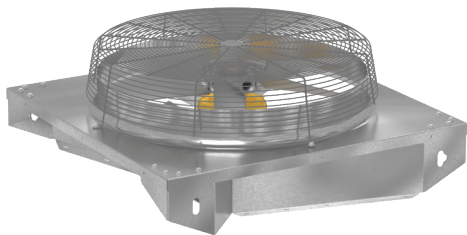
All dimensions in inches and weight is shown in pounds.



### Model AER Flush Mount

Model Variant	Propeller Dia.	A1	B1	C	D Max	E Max	Fan Weight
AER-20	20	26.032	4.000	9.016	22.977	16.500	143
AER-24	24	32.104	4.000	12.052	26.134	18.500	206
AER-30	30	38.104	5.000	14.052	25.891	18.250	218
AER-36	36	44.104	5.000	17.052	29.196	18.125	324

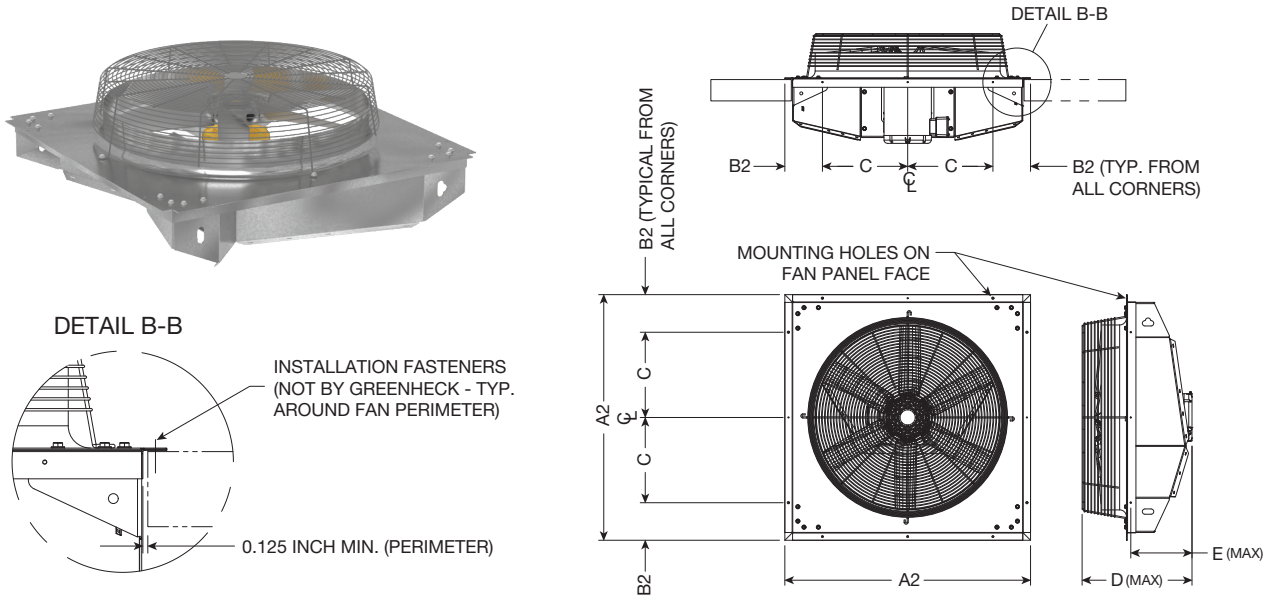
All dimensions in inches and weight is shown in pounds.



# Model AER Surface Mount

Model Variant	Propeller Dia.	A2	B2	C	D Max	E Max	Fan Weight
AER-20	20	27.928	4.980	9.016	22.977	16.500	143
AER-24	24	34.500	5.198	12.052	26.134	18.500	206
AER-30	30	40.500	5.000	14.052	25.891	18.250	218
AER-36	36	48.000	5.000	17.052	29.196	18.125	324

All dimensions in inches and weight is shown in pounds.



## Typical Installation

### DANGER

Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.

### DANGER

Pour écarter les risques d'incendie, de choc électrique ou de blessure grave, veiller à toujours débrancher, verrouiller et étiqueter la source de courant avant l'installation ou l'entretien.

Move fan to the desired location and determine the method by which the fan is to be mounted.

Attach the fan by inserting a suitable fastener through each of the pre-punched mounting holes in the fan panel.

**IMPORTANT:** Care should be taken not to bend or distort the fan panel or drive components during installation.

## Operation and Wiring

### 0-10V Input Only

These motors will accept a 0-10 VDC control signal for speed control. From 0-0.99V, the motor will be off, and will operate in the 1-10V range. The motor is pre-wired at the factory and cannot be changed inside the motor.

Connect single-phase power at the voltage listed on the nameplate, along with the 0-10 VDC signal for speed control.

**NOTE:** The motor will not operate without the proper control voltages.

Number	Color	Function
1	BROWN	50/60 Hz
2	BLACK	50/60 Hz
3	YELLOW/GREEN	PE
4	BLUE	COM
5	YELLOW	0-10 VDC

## Pre Start-Up Checks

Check all fasteners and setscrews for tightness. The propeller should rotate freely and not rub on the fan panel venturi.

Rotation direction of the propeller should be checked by momentarily turning the unit on. 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.

Any increase in fan speed represents a substantial increase in horsepower required from the motor. Always check motor load amperage and compare to nameplate rating when changing fan speed.



## Maintenance

### DANGER

Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.

### DANGER

Pour écarter les risques d'incendie, de choc électrique ou de blessure grave, veiller à toujours débrancher, verrouiller et étiqueter la source de courant avant l'installation ou l'entretien.

Once the fan has been put into operation, a periodic maintenance program should be set up to preserve the reliability and performance of the fan. Items to be included in this program are fasteners, setscrews and removal of dust and dirt.

### Fasteners and Setscrews

Any fan vibration has a tendency to loosen mechanical fasteners. A periodic inspection should include checking all fasteners and setscrews for tightness. Particular attention should be paid to fasteners and setscrews or taper-lock bushings attaching the propeller to the motor and the direct drive motor propeller assembly to the fan guard. Loose bearing setscrews will lead to premature failure of the fan shaft. In addition, check all fasteners attaching the motor to the motor plate.

### Lubrication

Many fractional horsepower motors installed are lubricated for life and require no further attention. Motors equipped with oil holes should be oiled in accordance with the manufacturer's instructions printed on the motor. Use a high grade SAE 20 machine oil and use caution not to over lubricate. Motors supplied with grease fittings should be greased according to directions printed on the motor.

### Removal of Dust and Dirt

Dirt can clog cooling openings on the motor housing, contaminate bearing lubricant and collect on propeller blades causing severe imbalance if left unchecked. The exterior surface of the motor, fan panel and entire propeller should be thoroughly cleaned periodically. Use caution and do not allow water or solvents to enter the motor. Motors must not be sprayed with steam or water.

### In General

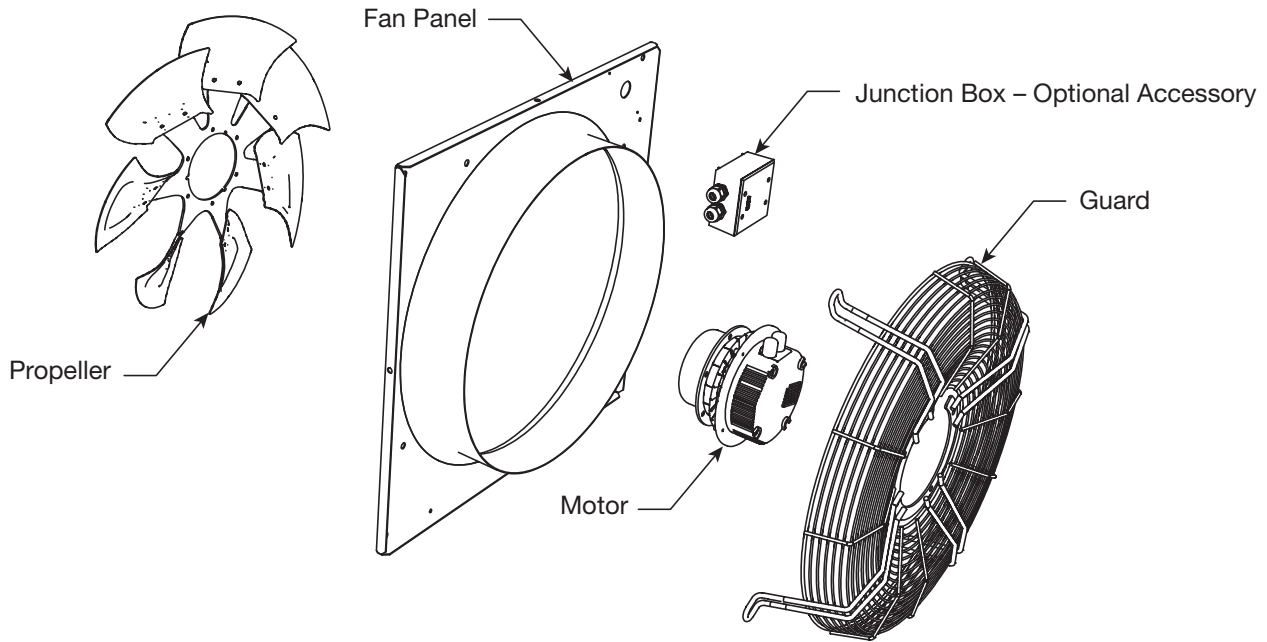
1. With a dry rag, periodically clean propeller, guard, and motor when excessive dirt and particles accumulate. Allow motor sufficient time to cool as it may be hot enough to cause injury.
2. Check for unusual noises when fan is running.
3. Periodically inspect and tighten all bolts.



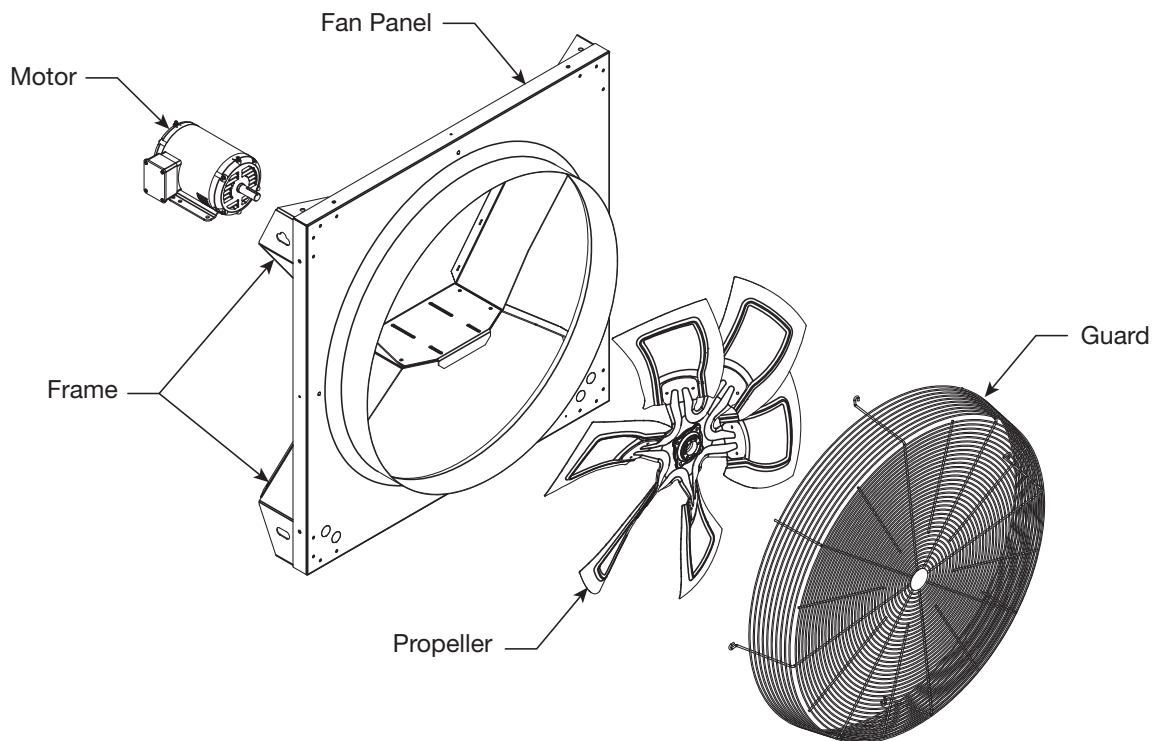
## Parts List

Each fan bears a manufacturer's nameplate with model number and serial number embossed. This information will assist the local representative and the factory in providing service and replacement parts. Before taking any corrective action, make certain unit is not capable of operation during repairs.

### Model ARC



### Model AER Condenser Variant



# Troubleshooting

## WARNING

Before taking any corrective action, make certain unit is not hot to the touch and capable of operation during repairs.

## AVERTISSEMENT

Avant d'entreprendre toute action corrective, s'assurer que l'appareil n'est pas chaud au toucher et qu'il ne pourra pas fonctionner durant les réparations.

PROBLEM	CAUSE	CORRECTIVE ACTION
Too much airflow	Resistance lower than designed	Decrease fan speed.
Reduced airflow	System resistance too high	Remove obstructions in the system. Clean coils and dirty filters. Check for adequate supply air for exhaust fans or exhaust air for supply fans.
	Fan speed too low	Increase fan speed.
	Excessive dirt buildup on propeller	Clean propeller.
Excessive noise	Excessive vibration	Clean dirt buildup from propeller. Check all setscrews and fasteners for tightness. Correct propeller imbalance. Check for loose dampers, guards or ductwork.
	Defective motor	Replace motor.
	Debris	Remove all debris from the fan.
	Loose or damaged propeller	Tighten or replace
Fan does not operate	Electrical supply	Check fuses/circuit breakers. Check for switches turned off or disconnected. Check for correct supply voltage and all electrical connections.
	Motor	Assure motor is correct horsepower and not tripping overload protector. Verify motor rotor is free for rotation. Make sure current is under FLA if able to operate during a certain period of time. See the specific motor cut sheet for more information.

**NOTE:** Thermal protection triggers when the NTC temperature reach 100° C and the motor will shut down. The motor will restart when NTC temperature drop back to 80°C.

# Maintenance Log

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## Our Commitment

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*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](http://Greenheck.com), either on the specific product page or in the literature section of the website at [Greenheck.com/Resources/Library/Literature](http://Greenheck.com/Resources/Library/Literature).

Greenheck's ARC and AER-Condenser Variant submittals provide additional information describing the equipment, fan performance, available accessories, and specification data.

