



This publication contains the installation, operation and maintenance instructions for standard units of the *REBEL/AQ/SEP/ETE/ETS: Propeller Roof Fans*.



**Carefully read this publication and any supplemental documents prior to any installation or maintenance procedure.**

Loren Cook catalog, *Propeller Roof Fans*, provides additional information describing the equipment, fan performance, available accessories and specification data.

For additional safety information, refer to AMCA Publication 410-96, *Safety Practices for Users and Installers of Industrial and Commercial Fans*.

All of the publications listed above can be obtained from:

- [lorencook.com](http://lorencook.com)
- [info@lorencook.com](mailto:info@lorencook.com)
- 417-869-6474 ext. 166

For information and instructions on special equipment, contact Loren Cook Company at 417-869-6474.

## Receiving and Inspection

Carefully inspect the fan and accessories for any damage and shortage immediately upon receipt of the fan.

- Turn the wheel by hand to ensure it turns freely and does not bind
- Check dampers (if included) for free operation of all moving parts
- Record on the *Delivery Receipt* any visible sign of damage

## Handling

Lift the fan by the base.

**NOTICE! Never lift by the shaft, motor or housing.**

If your fan is covered with a protective coating (e.g., phenolic enamels, or other protective coatings), handle with extreme care. Even a small chip will break the coating's continuity and destroy its ability to protect the metal.

Propellers are carefully balanced to give smooth, vibration-free operation. If the propeller is damaged during handling, it will require rebalancing.



## REBEL/AQD/SEP

## **!WARNING**

### Rotating Parts & Electrical Shock Hazard:

Fans should be installed and serviced by qualified personnel only.

Disconnect electric power before working on unit (prior to removal of guards or entry into access doors).

Follow proper lockout/tagout procedures to ensure the unit cannot be energized while being installed or serviced.

A disconnect switch should be placed near the fan in order that the power can be swiftly cut off, in case of an emergency and in order that maintenance personnel are provided complete control of the power source.

Grounding is required. All field-installed wiring must be completed by qualified personnel. All field installed wiring must comply with National Electric Code (NFPA 70) and all applicable local codes.

Fans and blowers create pressure at the discharge and vacuum at the inlet. This may cause objects to get pulled into the unit and objects to be propelled rapidly from the discharge. The discharge should always be directed in a safe direction and inlets should not be left unguarded. Any object pulled into the inlet will become a projectile capable of causing serious injury or death.

When air is allowed to move through a non-powered fan, the impeller can rotate, which is referred to as windmilling. Windmilling will cause hazardous conditions due to unexpected rotation of components. Impellers should be blocked in position or air passages blocked to prevent draft when working on fans.

Friction and power loss inside rotating components will cause them to be a potential burn hazard. All components should be approached with caution and/or allowed to cool before contacting them for maintenance.

Under certain lighting conditions, rotating components may appear stationary. Components should be verified to be stationary in a safe manner, before they come into contact with personnel, tools or clothing.

Failure to follow these instructions could result in death or serious injury.

The attachment of roof mounted fans to the roof curb as well as the attachment of roof curbs to the building structure must exceed the structural requirements based on the environmental loading derived from the applicable building code for the site. The local code official may require variations from the recognized code based on local data. The licensed engineer of record will be responsible for prescribing the correct attachment based on construction materials, code requirements and environmental effects specific to the installation.

## Storage

If the fan is stored for any length of time prior to installation, store it in its original shipping crate and protect it from dust, debris and the weather.

## Outdoor Storage

To maintain good working condition of the fan when it is stored outdoors or at a construction site, follow the additional instructions below.

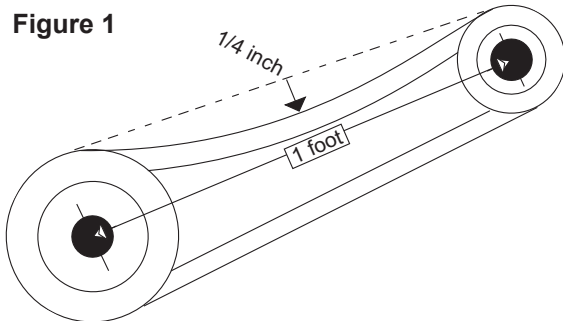
- Coat the shaft and bearings with grease or rust preventative compound to help seal out moisture
- Periodically rotate the propeller and operate the dampers (if supplied) to keep a coating of grease on all internal bearing parts
- Periodically inspect the fan to prevent damaging conditions.
- Block propeller to prevent natural rotation
- Cover the unit with some type of weather cover to prevent moisture, corrosion, dirt or dust accumulation

## Installation

### Damper Installation

If your fan is supplied with dampers, follow the directions below. If your fan does not include dampers, proceed to *Motor Installation*.

1. Place the damper inside the curb. Ensure the damper will open freely for the correct direction of the airflow.
2. Secure to curb at the damper shelf by installing at least two sheet metal screws (#10 x 1/2") on each side of the damper, through the tray, with the screw head catching the flange on the damper. This will prevent the exhaust dampers from lifting and keep the supply dampers centered.
3. Drill a hole in the curb shelf for conduit needed for motor wiring.
4. Operate the dampers manually to ensure the blades move freely. Dampers should be released from full open position to check for proper closing.



### Motor Installation (Belt Drive Fans)

To prevent damage to the fan during shipping, motors 5 HP and larger, and extremely heavy motors (cast iron or severe duty) are shipped loose and must be field mounted.

1. Remove the motor plate mounting bolts and the motor plate.
2. Remove the motor mounting bolts from the motor plate.
3. Mount the motor to the motor plate aligning to the appropriate holes.
4. Place the motor plate on the power assembly and re-install the mounting bolts.

## Tolerance

Center Distance	Max. Gap
Up thru 12"	1/16"
12" up through 48"	1/8"
Over 48"	1/4"

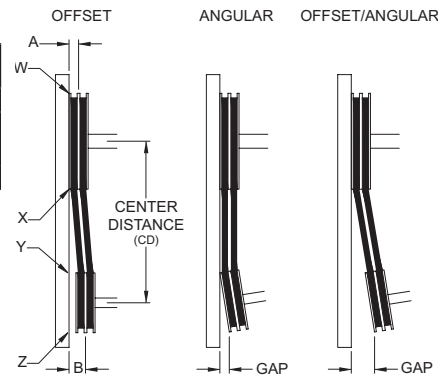


Figure 2

### Belt and Pulley Installation

If your fan is a direct drive, proceed to *Wiring Installation*.

Belt tension is determined by the sound of the belts when the fan is first started. The belts will produce a loud squeal, which dissipates after the fan is operating at full capacity.

If belt tension is too tight or too loose, lost efficiency and damage can occur.

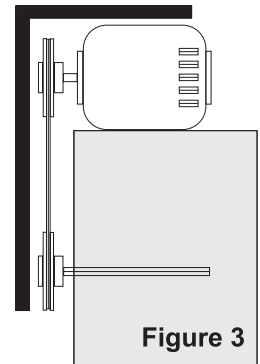
Do not change the pulley pitch diameter to change tension. The change will result in a different fan speed.

1. Loosen the motor plate adjustment nuts on motor base and move motor plate in order that the belts can easily slip into the grooves on the pulleys. Never pry, roll, or force the belts over the rim of the pulley.
2. Adjust the motor plate until proper tension is reached. For proper tension, a deflection of approximately 1/4" per foot of center distance should be obtained by firmly pressing the belt. Refer to *Figure 1*.
3. Lock the motor plate adjustment nuts in place.
4. Ensure pulleys are properly aligned. Refer to *Figure 2*.

### Pulley Alignment

Pulley alignment is adjusted by loosening the motor pulley set-screw and by moving the motor pulley on the motor shaft.

*Figure 2* indicates where to measure the allowable gap for the drive alignment tolerance. All contact points (indicated by WXYZ) are to have a gap less than the tolerance shown in the table. When the pulleys are not the same width, the allowable gap must be adjusted by half of the difference in width. *Figure 3* illustrates using a carpenter's square to adjust the position of the motor pulley until the belt *Figure 3* is parallel to the longer leg of the square.



### Wiring Installation

All wiring should be in accordance with local ordinances and the National Electrical Code, NFPA 70. Ensure the power supply (voltage, frequency, and current carrying capacity of wires) is in accordance with the motor nameplate. Refer to the *Wiring Diagrams* on page 3.

**Lock off all power sources before unit is wired to power source.**

Leave enough slack in the wiring to allow for motor movement when adjusting belt tension.

**NOTICE! Follow the wiring diagram in the disconnect switch and the wiring diagram provided with the motor. Correctly label the circuit on the main power box and always identify a closed switch to promote safety (i.e., red tape over a closed switch).**



## Fan Installation

The fan support (roof curb) should provide a level surface for installation. If the roof is pitched more than 1/2:12, a sloped curb must be used to correct for the incline.

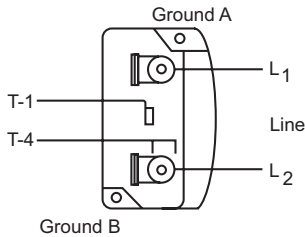
Place fan over roof opening. Secure the fan with lag screws, anchor bolts, or other suitable fasteners.

### Recommended Torque for Setscrews/Bolts (IN-LB)

Setscrews				Hold Down Bolts	
Size	Key Hex Across Flats	Recommended Torque		Size	Recommended Torque
		Min.	Max.		
#8	5/64"	15	21	3/8"-16	324
#10	3/32"	27	33	1/2"-13	780
1/4	1/8"	70	80	5/8"-11	1440
5/16	5/32"	140	160	3/4"-10	2400
3/8	3/16"	250	290	7/8"-9	1920
7/16	7/32"	355	405	1"-8	2700
1/2	1/4"	560	640	1-1/8"-7	4200
5/8	5/16"	1120	1280	1-1/4"-7	6000
3/4	3/8"	1680	1920	-	-
7/8	1/2"	4200	4800	-	-
1	9/16"	5600	6400	-	-

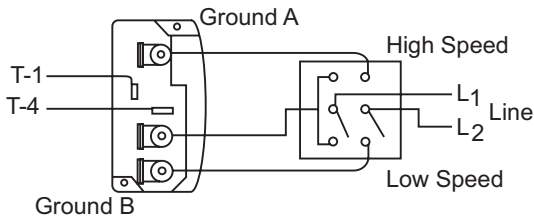
## Wiring Diagrams

### Single Speed, Single Phase Motor



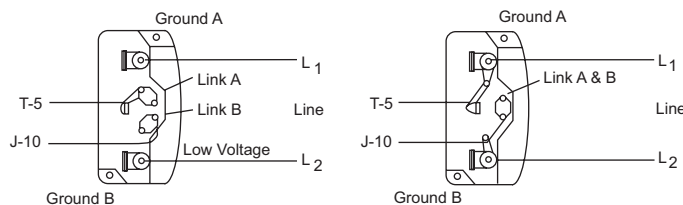
When ground is required, attach to ground A or B with No. 6 thread forming screw. To reverse, interchange T-1 and T-4.

### 2 Speed, 2 Winding, Single Phase Motor



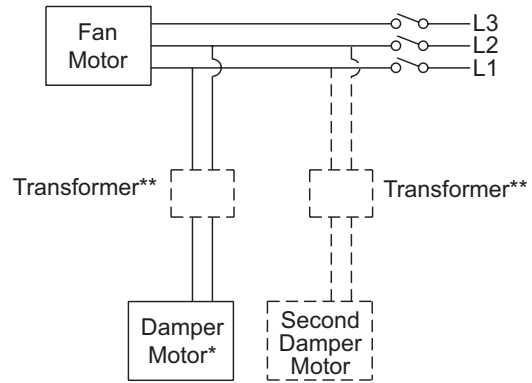
When ground is required, attach to ground A or B with No. 6 thread forming screw. To reverse, interchange T-1 and T-4 leads.

### Single Speed, Single Phase, Dual Voltage



When ground is required, attach to ground A or B with No. 6 thread forming screw. To reverse, interchange T-5 and J-10 leads.

## Typical Damper Motor Schematic

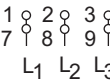
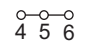


For 3 Phase, damper motor voltage should be the same between  $L_1$  and  $L_2$ . For single phase application, disregard  $L_3$ . \*Damper motors may be available in 115, 230 and 460 volt models. The damper motor nameplate voltage should be verified prior to connection. \*\*A transformer may be provided in some installations to correct the damper motor voltage to the specified voltage.

### 3 Phase, 9 Lead Motor

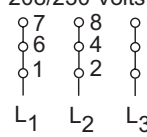
#### Y-Connection

Low Voltage  
208/230 Volts

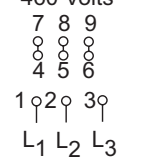


#### Delta-Connection

Low Voltage  
208/230 Volts

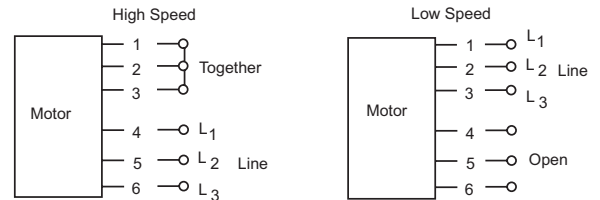


High Voltage  
460 Volts



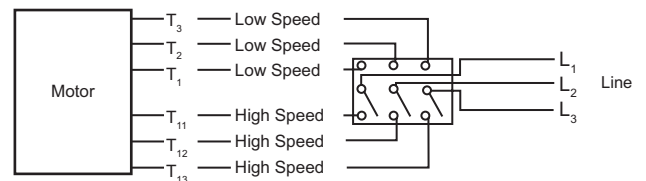
To reverse, interchange any two line leads.

### 2 Speed, 1 Winding, 3 Phase Motor



To reverse, interchange any two line leads. Motors require magnetic control.

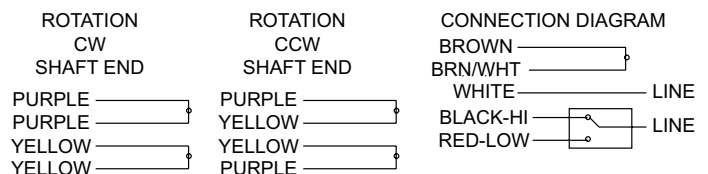
### 2 Speed, 2 Winding, 3 Phase



#### To Reverse:

- High Speed: Interchange leads  $T_{11}$  and  $T_{12}$ .
- Low Speed: Interchange leads  $T_1$  and  $T_2$ .
- Both Speeds: Interchange any two line leads.

### REBEL Motor Wiring Diagram 125 V Single Phase



EXHAUST: Hub side away from motor. SUPPLY: Hub side towards motor.

## Final Installation Steps

1. Inspect fasteners and setscrews, particularly fan mounting and bearing fasteners, and tighten according to the recommended torque shown in the table below, *Recommended Torque for Setscrews/Bolts*.
2. Inspect for voltage with a voltmeter.
3. Ensure all accessories are installed.
4. Check wheel-to-inlet clearance on power roof fans.
5. Test the fan to be sure the rotation is the same as indicated by the arrow marked "Rotation."

## Operation

### Pre-Start Checks

1. Lock out all the primary and secondary power sources.
2. Inspect fasteners and setscrews, particularly those used for mounting the fan, and tighten if necessary.
3. Inspect belt tension and pulley alignment. (Remember, if belt tension is correct, a loud squeal occurs as the fan increases to full power.)
4. Inspect motor wiring.
5. Ensure the belt touches only the pulleys.
6. Ensure fan and ductwork are clean and free of debris.
7. Test the fan to ensure the rotation of the wheel is the same as indicated by the rotation label.
8. Close and secure all access doors.
9. Restore power to unit.

### Start-Up

Turn the fan on. In variable speed units, set the fan to its lowest speed. Inspect for the following:

- Direction of rotation
- Excessive vibration
- Unusual noise
- Bearing noise
- Improper belt alignment or tension (listen for a continuous squealing noise)
- Improper motor amperage or voltage.

***If a problem is discovered, immediately shut off the fan. Lock out all electrical power and check for the cause of the trouble. Refer to Troubleshooting, page 5.***

## Inspection

Inspection of the fan should be conducted at the first **30 minute, 8 hour and 24 hour** intervals of satisfactory operation. During the inspections, stop the fan and inspect as per the chart below.

### 30 Minute Interval

Inspect bolts, setscrews, and motor mounting bolts. Adjust and tighten as necessary.

### 8 Hour Interval

Inspect belt alignment and tension. Adjust and tighten as necessary.

### 24 Hour Interval

Inspect belt tension. Adjust and tighten as necessary.

## Filter

If you fan is not supplied with filters proceed to *Maintenance*.

Inspect filters within the first two weeks of operation. If there is no excessive build-up, monthly servicing should be adequate.

To clean reusable aluminum filters, back flush with soap and water. When clean, shake off excess water and allow the filter to air-dry before reinstalling it.

## Maintenance

Establish a schedule for inspecting all parts of the fan. The frequency of inspection depends on the operating conditions and location of the fan.

Inspect belt alignment and tension. Adjust and tighten as necessary.

Inspect fans exhausting corrosive or contaminated air within the first month of operation. Fans exhausting contaminated air (airborne abrasives) should be inspected every three months. Clean the wheel and air inlets if material build-up is excessive. Excessive build-up can cause imbalance and failure of the wheel.

Regular inspections are recommended for fans exhausting non-contaminated air.

**It is recommended the following inspections be conducted twice per year:**

- Inspect bolts and setscrews for tightness. Tighten as necessary. Refer to *Torque chart*
- Inspect belt wear and alignment. Replace worn belts with new belts and adjust alignment as needed. Refer to *Belt and Pulley Installation, page 2*
- Bearings should be inspected as recommended in the *Conditions Chart*
- Inspect for cleanliness. Clean exterior surfaces only. Removing dust and grease on motor housing assures proper motor cooling

## Lubricants

Loren Cook Company uses petroleum lubricant in a lithium base conforming to NLGI grade 2 consistency. Other grades of grease should not be used unless the bearings and lines have been flushed clean. If another grade of grease is used, it should be lithium-based.

An NLGI grade 2 grease is a light viscosity, low-torque, rust-inhibiting lubricant that is water resistant. Its temperature range is from -30°F to +200°F and capable of intermittent highs of +250°F.

## Motor Bearings

Motor bearings are pre-lubricated and sealed. Under normal conditions they will not require further maintenance for a period of ten years. However, it is advisable to have your maintenance department remove and disassemble the motor, and lubricate the bearings after three years of operation in excessive heat and or in a contaminated airstream consisting of airborne abrasives.

### Conditions Chart

RPM	Temp (°F)	Fan Status	Greasing Interval
100	Up to 120°	Clean	6 to 12 months
500	Up to 150°	Clean	2 to 6 months
1000	Up to 210°	Clean	2 weeks to 2 months
1500	Over 210°	Clean	Weekly
Any Speed	Up to 150°	Dirty	1 week to 1 month
Any Speed	Over 150°	Dirty	Daily to 2 weeks
Any Speed	Any Temp	Very Dirty	Daily to 2 weeks
Any Speed	Any Temp	Extreme Conditions	Daily to 2 weeks

## Fan Bearings

Fan bearings are lubricated through a grease connector and should be lubricated by the schedule, Conditions Chart, shown above.

For best results, lubricate the bearing while the fan is rotating. Slowly pump grease into the bearing until a slight bead forms around the bearing seals. Excessive grease can burst seals thus reduce bearing life.

In the event the bearing cannot be seen, use no more than three injections with a hand-operated grease gun. In the event that the bearing cannot be seen, use no more than three injections with a hand operated grease gun.

## Motor Services

Should the motor prove defective within a one-year period, contact your local Loren Cook representative or your nearest authorized electric motor service representative.

## Changing Shaft Speed

All belt driven H-Series fans with motors up to and including 5HP are equipped with variable pitch pulleys. To change the fan speed, perform the following:

- Loosen setscrew on driver (motor) pulley and remove key, if equipped.
- Turn the pulley rim to open or close the groove facing. If the pulley has multiple grooves, all must be adjusted to the same width.
- After adjustment, inspect for proper belt tension.

### Speed Reduction

Open the pulley in order that the belt rides deeper in the groove (smaller pitch diameter).

### Speed Increase

Close the pulley in order that the belt rides higher in the groove (larger pitch diameter). Ensure that the RPM limits of the fan and the horsepower limits of the motor are maintained.

## Maximum RPM

AQB Size	Maximum RPM	SEP Size	Maximum RPM	ETE/ETS	Maximum RPM
24	1025	24	1150	24	1160
30	850	30	850	30	930
36	725	36	725	36	780
42	625	42	610	42	665
48	575	48	565	48	660
				50	640
				60	615

## Pulley and Belt Replacement

- Clean the motor and fan shafts.
- Loosen the motor plate mounting bolts to relieve the belt tension. Remove the belt.
- Loosen the pulley setscrews and remove the pulleys from the shaft.
- If excessive force is required to remove the pulleys, a three-jaw puller can be used. This tool, however, can easily warp a pulley. If the puller is used, inspect the trueness of the pulley after it is removed from the shaft. The pulley will need replacement if it is more than 0.020 inch out of true.
- Clean the bores of the pulleys and place a light coat of oil on the bores.
- Remove grease, rust and burrs from the shaft.
- Place fan pulley on the fan shaft and the motor pulley on the motor shaft. Damage to the pulleys can occur when excessive force is used in placing the pulleys on their respective shafts.
- After the pulleys have been correctly placed back onto their shafts, tighten the pulley setscrews.
- Install the belts on the pulleys. Align and adjust the belts to the proper tension as described in *Belt and Pulley Installation*, page 2.

## Bearing Replacement

The fan bearings are pillow block ball bearings.

- Remove the top cap to gain access to the fan.
- Loosen the motor plate mounting bolts and remove the drive belts.
- Remove the propeller from the shaft.
- Remove the four (4) bearing hold-down bolts and then remove the shaft and bearings from the fan as an assembly.
- Measure and record the location of the bearings on the shaft. This will aid the reassembly.
- Loosen the bearing setscrews and remove the bearings from the shaft.
- Remove any imperfections in the shaft using a smooth file or emery cloth.
- Place new bearings on the shaft.
- Locate one of the bearings using the previous measurements and tighten one setscrew.
- Install the propeller on the shaft. Center the propeller in the opening and tighten the bearing bolts.
- Rotate the propeller to allow the bearings to find their center of free movement.
- Align the bearing setscrews and tighten to proper torque. Refer to the *Torque Chart*, page 3.
- Reassemble drive assembly and replace top cap.

## Propeller and Shaft Replacement Precautions

- If the shaft is dropped and bent, it may cause unbalanced operation of the fan
- When handling the propeller separately from the shaft, place a support through the hub for lifting, making sure not to injure the finished bore of the propeller
- Never allow the propeller to rest its entire weight on the blades. The propeller and shaft can be lifted by slings around the shaft on each side of the propeller so the propeller is supported by its hub
- If using a chain to lift the propeller, make sure there is sufficient padding on the shaft and propeller. This prevents the scoring of the shaft or injury to the propeller. The chain or cable should be spread with timbers, or braced by some other method to prevent damage to the propeller side plates

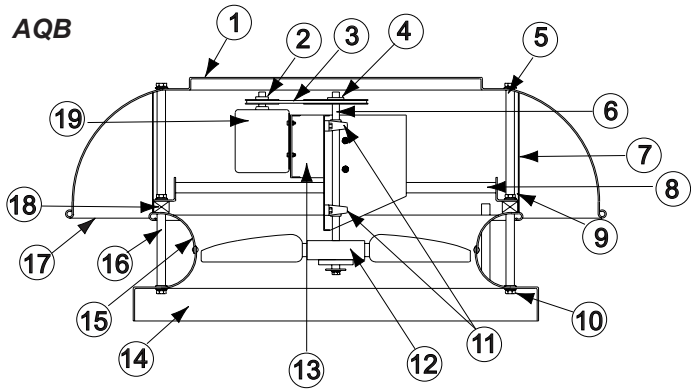
## Troubleshooting

Problem and Potential Cause
<p><b>Low Capacity or Pressure:</b></p> <ul style="list-style-type: none"><li>• Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly</li><li>• Poor fan inlet conditions. There should be a straight clear duct at the inlet</li><li>• Improper wheel alignment</li></ul>
<p><b>Excessive Vibration and Noise:</b></p> <ul style="list-style-type: none"><li>• Damaged or unbalanced wheel</li><li>• Belts too loose; worn or oily belts</li><li>• Speed too high</li><li>• Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly</li><li>• Bearings need lubrication or replacement</li><li>• Fan surge</li></ul>
<p><b>Overheated Motor:</b></p> <ul style="list-style-type: none"><li>• Motor improperly wired</li><li>• Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly</li><li>• Cooling air diverted or blocked</li><li>• Improper inlet clearance</li><li>• Incorrect fan RPMs</li><li>• Incorrect voltage</li></ul>
<p><b>Overheated Bearings:</b></p> <ul style="list-style-type: none"><li>• Improper bearing lubrication</li><li>• Excessive belt tension</li></ul>

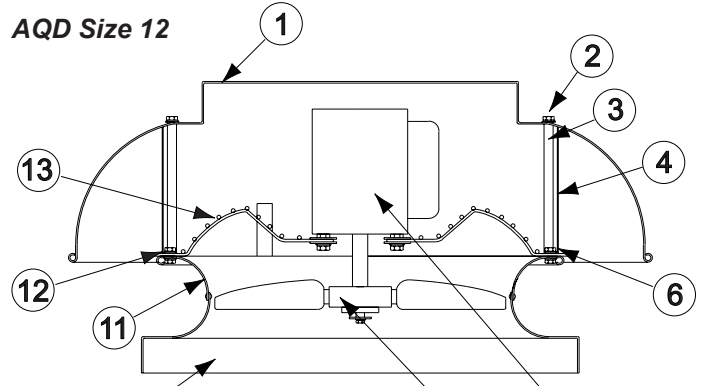
# Parts List

## AQB/SEP/AQD

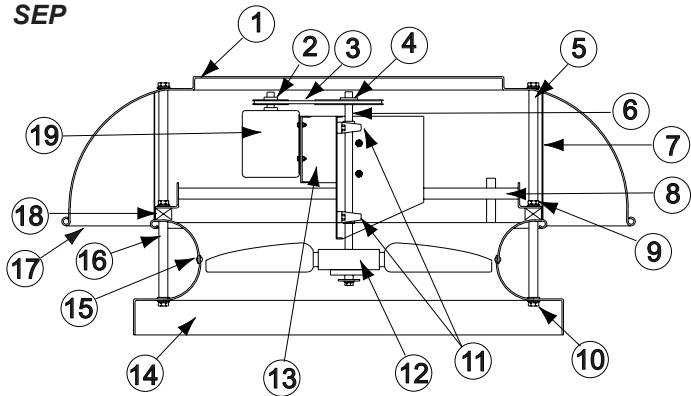
### AQB



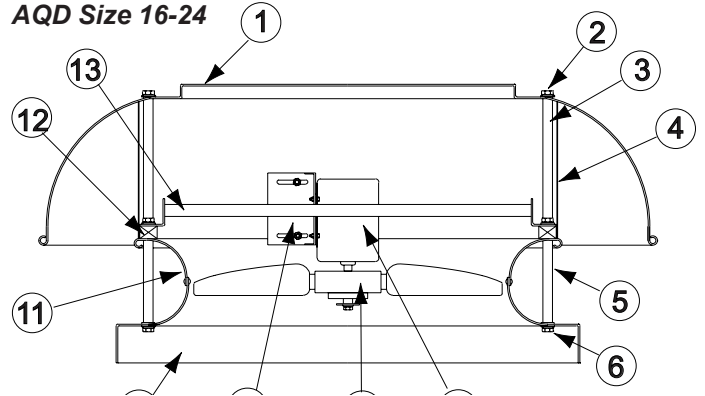
### AQD Size 12



### SEP



### AQD Size 16-24

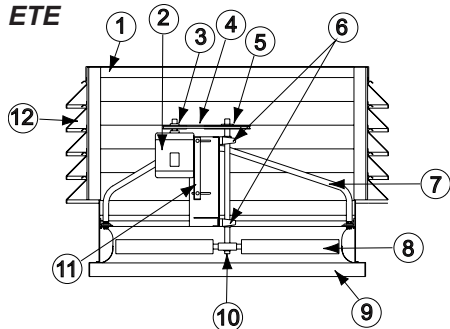


Part No.	Description				
	Size 24	Size 30	Size 36	Size 42	Size 48
1	Baffle				
2	Driver Sheave				
3	Belt Set				
4	Driven Sheave				
5	Upper Post (4)		Upper Post (8)	Upper Post (8)	
6	Shaft				
7	Birdscreen				
8	Power Assembly				
9	3/8" Nut (4)			3/8" Nut (8)	
10	3/8" Bolt (4)			3/8" Bolt (9)	
11	Bearings (2)				
12	Cast Propeller Assembly				
13	Motor Plate				
14	Base				
15	Venturi				
16	Lower Posts (4)				
17	Baffle Brake				
18	Isolators (4)				
19	Motor				

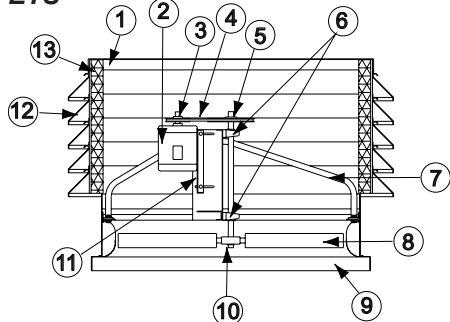
Part No.	Description			
	Size 12	Size 16	Size 20	Size 24
1	Baffle			
2	5/16" Bolt (12)			
3	Upper Post (4)			
4	Birdscreen			
5	-			Lower Post (4)
6	5/16" Nut (4)			
7	Motor			
8	Propeller			
9	-	Motor Plate	Motor Plate	
10	Base			
11	Venturi			
12	-	Isolator (4)		
13	Power Assembly			

# ETE/ETS/REBEL

## ETE

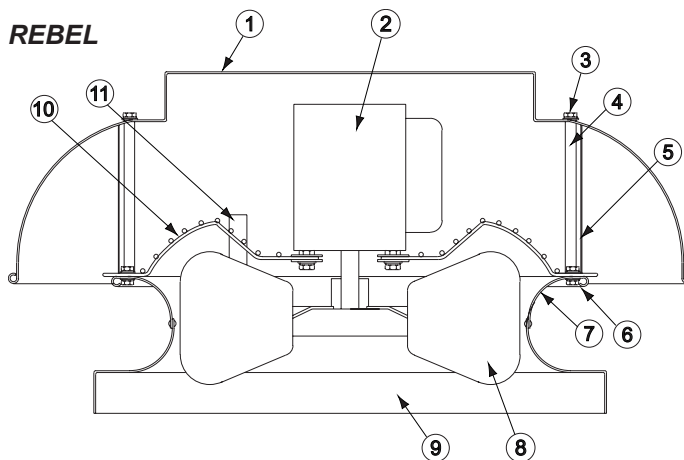


## ETS



Part No.	Description	
	ETE Sizes 24-60	ETS Sizes 24-60
1	Top Cap	
2	Motor	
3	Driver Sheave	
4	Belt Set	
5	Driven Sheave	
6	Bearings (2)	
7	Power Assembly	
8	Propeller	
9	Base	
10	Shaft	
11	Motor Plate	
12	Tiered Hood	
13	-	Filters

## REBEL



Part No.	Description
1	Top Cap
2	Motor
3	5/16" Bolt (4)
4	Support Post (4)
5	Birdscreen (Optional)
6	5/16" Bolt (4)
7	Venturi
8	Stamped Steel Propeller
9	Base
10	Wireguard
11	Conduit

## Limited Warranty

Loren Cook Company warrants that your Loren Cook fan was manufactured free of defects in materials and workmanship, to the extent stated herein. For a period of one (1) year after date of shipment, we will replace any parts found to be defective without charge, except for shipping costs which will be paid by you. This warranty is granted only to the original purchaser placing the fan in service. This warranty is void if the fan or any part thereof has been altered or modified from its original design or has been abused, misused, damaged or is in worn condition or if the fan has been used other than for the uses described in the company manual. This warranty does not cover defects resulting from normal wear and tear. To make a warranty claim, notify Loren Cook Company, General Offices, 2015 East Dale Street, Springfield, Missouri 65803-4637, explaining in writing, in detail, your complaint and referring to the specific model and serial numbers of your fan. Upon receipt by Loren Cook Company of your written complaint, you will be notified, within thirty (30) days of our receipt of your complaint, in writing, as to the manner in which your claim will be handled. If you are entitled to warranty relief, a warranty adjustment will be completed within sixty (60) business days of the receipt of your written complaint by Loren Cook Company. This warranty gives only the original purchaser placing the fan in service specifically the right. You may have other legal rights which vary from state to state.



# LOREN COOK COMPANY

Corporate Offices: 2015 E. Dale St. Springfield, MO 65803  
 Phone 417-869-6474 | Fax 417-862-3820 | [lorencook.com](http://lorencook.com)