Power-Plume®

Powered Induction

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

This publication contains the installation, operation and maintenance instructions for standard units of the Power-Plume®.

Carefully read this publication prior to any installation or maintenance procedure.

Loren Cook catalog, *Power-Plume®*, 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
- *info@lorencook.com*
- 417-869-6474 ext. 166

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

Receiving

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.

Record on the Delivery Receipt any visible sign of damage.

Handling

Lift the fan by lifting lugs. Never lift by the shaft, motor, or housing.

Storage

If the fan is stored for any length of time prior to installation, completely fill the bearings with grease or moisture-inhibiting oil. Refer to Lubricants on page 3. Also, store the fan in its original crate and protect it from dust, debris and the weather.

Power-Plume®

⚠ 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. Ensure the power supply (voltage, frequency and current carrying capacity of wires) is in accordance with the motor nameplate.

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.

• Cover the inlet and outlet opening to prevent the accumulation of dirt and moisture in the housing.

• Periodically rotate the wheel to keep a coating of grease on all internal bearing parts.

• Periodically inspect the unit to prevent damaging conditions.

Installation

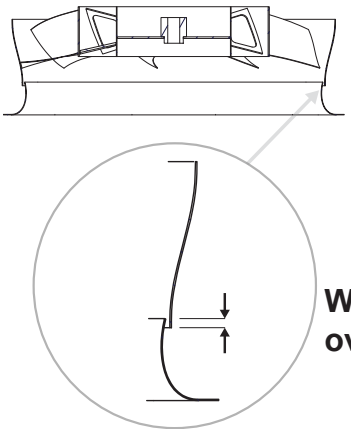
The Power-Plume® can be curb mounted or mounted to a roof mounted laboratory exhaust fan. The Power-Plume® should not be mounted on sheet metal roof curbs, but may be mounted to a Cook LEC, Laboratory Exhaust Curb, attached per recommended attachment methods. The proper attachment method should be defined by the local authority.

Wheel-to-Inlet Clearance

The correct wheel-to-inlet clearance is critical to proper fan performance. This clearance should be verified before initial start-up since rough handling during shipment could cause a shift in fan components. Refer to wheel/inlet drawing below for correct overlap.

Adjust the overlap by loosening the wheel hub and moving the wheel along the shaft to obtain the correct value. Trim balance as necessary (.0785 in/sec max).

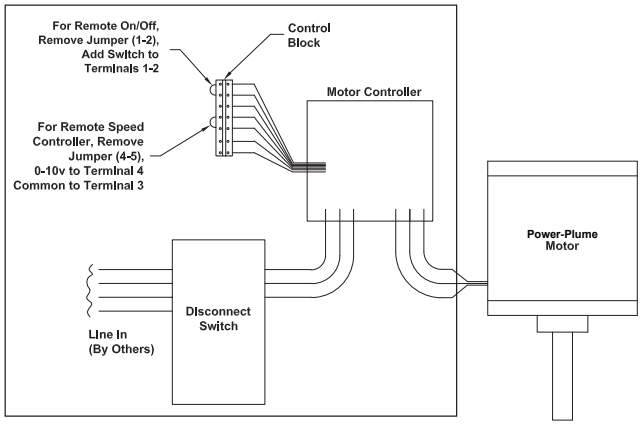
A uniform radial gap (space between the edge of the cone and the edge of the inlet) is obtained by loosening the inlet cone bolts and repositioning the inlet cone.



Wheel / inlet overlap 3/8”

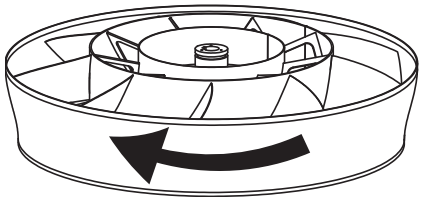
Wiring Installation

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.



Wheel Rotation

Test the fan to ensure the rotation of the wheel is the same as indicated by the arrow marked Rotation.



Final Installation Steps

1. Inspect fasteners, particularly fan mounting fasteners, and tighten according to the recommended torque shown in the table Recommended Torque for Setscrews/Bolts.
2. Inspect for correct voltage with voltmeter.
3. Ensure all accessories are installed.

Operation

Pre-Start Checks

1. Lock out all the primary and secondary power sources.
2. Ensure fasteners, particularly those used for mounting the fan, are tightened.
3. Inspect motor wiring.
4. Ensure fan and ductwork are clean and free of debris.
5. Inspect wheel-to-inlet clearance. The correct wheel-to-inlet clearance is critical to proper fan performance.
6. Close and secure all access doors.
7. Restore power to the fan.

Start Up

Turn the fan on. Set the fan to its lowest speed and inspect for the following:

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

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

Winter Operation

When operating the Power-Plume in near or below freezing weather there is always the potential for ice buildup on any exposed surfaces, stationary or rotating. Frequent inspection is very important for proper operation of the unit. Under certain conditions severe ice buildup can occur in a matter of minutes. These conditions are not only produced by the weather but by the installation as well. Only observation and experience will provide any level of certainty for the safe and ice free operation of the Power-Plume in any given location. If ice is discovered during operation the unit should be shut down immediately and the ice removed before operation is resumed.

A useful accessory for cold-climate operation is a vibration cut-out switch. Should ice buildup begin, the resulting vibration would be detected and the switch could prevent potentially catastrophic damage.

Tight clearances between the rotor and stationary members could “freeze over” during non-operating hours. Therefore, the unit should always be inspected to ensure the rotor is released and air passageways are open and clear of all debris prior to any restart.

NOTICE! Although a certain amount of vibration is inherent in operating fans, extreme vibration is a serious problem that may cause structural and mechanical failure.

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

Recommended Torque for Setscrews Bolts (in / lbs.)

Size	Key Hex Across Flats	Recommended Torque		Hold Down Bolts	
		Min.	Max.	Size	Wrench Torque
No.10	3/32”	28	33	3/8”-16	240
1/4”	1/8”	66	80	1/2”-13	600
5/16”	5/32”	126	156	5/8”-11	1200
3/8”	3/16”	228	275	3/4”-10	2100
7/16”	7/32”	348	384	7/8”-9	2400
1/2”	1/4”	504	600	1” -8	3000
5/8”	5/16”	1104	1200	1 1/8”-7	4200
3/4”	3/8”	1440	1800	1 1/4”-7	6000

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 fans exhausting corrosive or contaminated air within the first month of operation. Fans exhausting contaminated air (airborne abrasives) should be inspected every three months.

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

It is recommended the following inspection be conducted twice per year.

- Inspect bolts and setscrews for tightness. Tighten as necessary.
- 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. Removing dirt from the wheel and housing prevents imbalance and damage

Lubrication - Motor Bearings

Motors are provided with prelubricated bearings. Any lubrication instructions shown on the motor nameplate supersede instructions below.

Motor bearings without provisions for relubrication will operate up to 10 years under normal conditions with no maintenance. In severe applications, high temperatures or excessive contaminates, it is advisable to have the maintenance department disassemble and lubricate the bearings after 3 years of operation to prevent interruption of service.

For motors with provisions for relubrication, follow intervals of the “Relubrication Intercals” table.

Motors are provided with a polyurea mineral oil NGLI #2 grease. All additions to the motor bearings are to be with a compatable grease such as Exxon Mobil Polyrex EM and Chevron SRI.

Relubrication Intervals					
Service Conditions	NEMA Frame Size				
	Up to and including 184T		213T-365T		404T and larger
	1800 RPM and less	Over 1800 RPM	1800 RPM and less	Over 1800 RPM	1800 RPM and less
Standard	3 yrs.	6 months	2 yrs.	6 months	1 yr.
Severe	1 yr.	3 months	1 yr.	3 months	6 months

The above intervals should be reduced to half for vertical shaft installations.

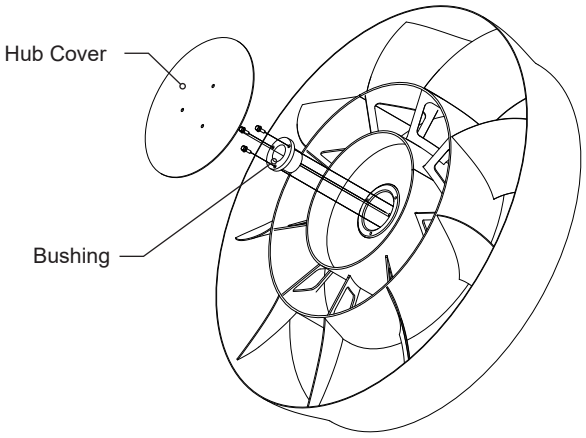
Motor Services

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

Motor Replacement

The motor can be removed using the following sequence. (Requires purchase of two eyelet bolts.)

1. Disconnect the power to the Power-Plume®.
2. Disconnect the motor control wires from the service switch that is located on the motor housing.
3. Remove the top section of the windband
4. Remove the cover plate from the wheel hub.
5. Loosen the bolts in the bushing and remove the wheel from the motor shaft (see image below).



6. Remove two of the mounting bolts and install the purchased eyelet bolts.
7. Remove the motor lubrication lines from the motor mounting plate.
8. Lift the motor using the Purchased eyelet bolts.
9. Remove the motor mounting bolts and motor mounting plate.

To replace the motor reverse the steps used to remove.

Troubleshooting

Problem and Potential Cause

Low Capacity or Pressure

- Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows.
- Poor fan inlet or outlet conditions. There should be a straight clear duct at the inlet or outlet.
- Improper wheel alignment

Excessive Vibration and Noise

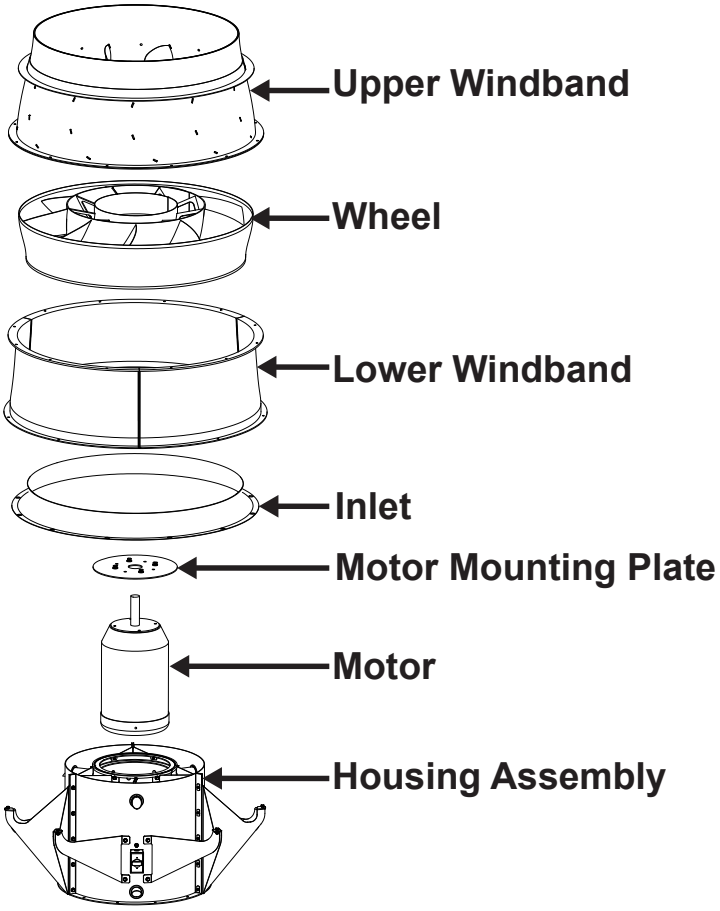
- Damaged wheel.
- Loose fasteners.
- Speed too high.
- Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows.
- Wheel bushing is loose.
- Bearings need lubrication or replacement.
- Debris in impeller.
- Fan surge.

Overheated Motor

- Motor improperly wired.
- Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows.
- Cooling air diverted or blocked.
- Improper inlet clearance.
- Incorrect fan speed.
- Incorrect voltage.

Overheated Bearings

- Improper bearing lubrication



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

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