

This publication contains the installation, operation and maintenance instructions for standard units of the VA/AVA/VF: Vane Axial Inline Blowers.

- VAD/VAB/VAHB
- AVAD/AVAB
- AFB-C/AFBV-C
- AFB-H/AFBC-H
- AFB-S/AFBV-S
- AFD-C/AFDV-C



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

Loren Cook catalog, VA/AVA/AF, 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 and Inspection

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

- Turn the propeller by hand to ensure it turns freely and does not bind.
- Record on the Delivery Receipt any visible sign of damage.

Handling

Handle your equipment with care. Some fans are provided with lifting lugs or eyes for easy handling. Others must be handled using nylon straps or well-padded chains and cables which protect the fan's coating and housing. SPrreader bars should be used when lifting large parts.

Axial fans should not be lifted by using straps around the fan housing only.

NOTICE! Never lift by the motor, motor base, propeller or flanges.



VAD

!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.

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 *Lubrication*, pages 6-7). Store the fan in its original crate and protect it from dust, debris and weather.

Outdoor Storage

To maintain good working condition of a Vane Axial fan when it is stored outdoors or on a construction site, follow the additional steps below.

- Cover the inlet and outlet and belt tunnel opening to prevent the accumulation of dirt and moisture in the housing.
- Periodically rotate the prop and operate dampers (if supplied) to keep a coating of grease on all internal bearing parts.
- Periodically inspect the unit to prevent damaging conditions.

Installation

To prevent damage to the fan during shipping, motors 25 HP and larger and extremely heavy motors (cast iron or severe duty) are shipped loose and must be field mounted by bolting the motor on the motor mounting plate in the existing mounting slots.

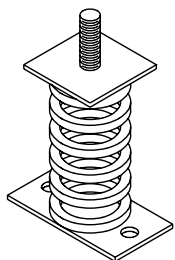
NOTICE! *Extreme vibration is a serious problem that may cause structural and mechanical failure. To help vibration and noise from being transferred to the building, isolators are recommended.*



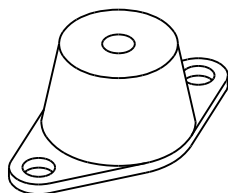
Isolation Installation

Floor Mounted Spring Isolators

1. Mount fan and motor on unitary base (if supplied).
2. Elevate fan (or isolation base) to operating height and insert blocks to hold in position.
3. Position isolators under the fan and vertically align by inserting leveling bolt through mounting holes in the fan or the base. The isolator must be installed on a level surface.
4. Adjust the isolators by turning the leveling nut counterclockwise several turns at a time alternately on each isolator until the fan weight is transferred onto the isolators and the fan raises uniformly off the blocks. Then remove the blocks.
5. Turn lock nut onto leveling bolt and secure firmly in place against the top of the mounting flange or frame.
6. Secure isolators to mounting surface.



Spring Isolator



Rubber-in-Shear Isolator

Figure 1 - Floor Mount Isolators

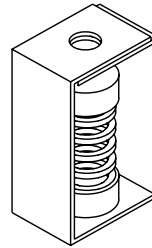
Floor Mounted Rubber-In-Shear (RIS) Isolators

1. Mount fan and motor on a unitary isolation base (if supplied).
2. Elevate fan to provide room to insert isolators between the fan and foundation and block in position.

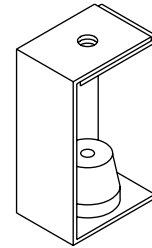
3. Position isolators under fan and secure bolts.
4. Remove blocks and allow fan to rest on floor. Isolators must be installed on a level surface (leveling should not be required).
5. Secure isolators to mounting surface.

Ceiling Mounted Spring and Rubber-in-Shear (RIS) Isolators

1. Elevate fan to operating height and brace.
2. Attach threaded rod to overhead support structure directly above each mounting hole. Rod should extend to within a few feet of fan.
3. Attach isolator to end of threaded rod using a nut on each side of isolator bracket.
4. Insert another section of threaded rod through the fan mounting hole and isolator.
5. Attach two nuts to threaded rod in isolator.
6. Place adjusting nut and locking nut on threaded rod near fan mounting bracket.
7. Alternately rotate adjusting nut at each mounting location until the fan weight is uniformly transferred to the isolators. Remove bracing.



Ceiling Mounted Spring Isolator



Rubber-in-Shear Ceiling Isolator

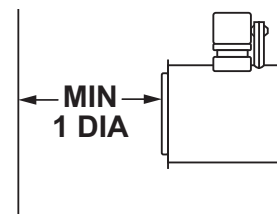
Figure 2 - Ceiling Mount Isolators

Duct Installation

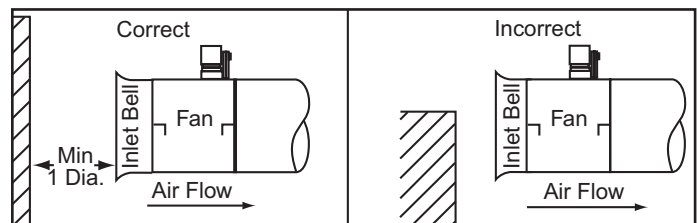
Efficient fan performance relies on the proper installation of inlet and discharge ducts. Be sure your fan conforms to the following guidelines.

Non-Ducted Inlet Clearance

If your fan has an open inlet (no duct work), the fan must be placed one fan wheel diameter away from walls and bulkheads.



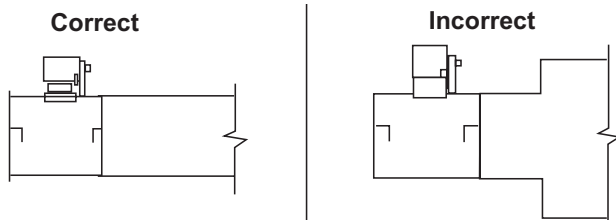
Non-ducted Inlet Clearance



Inlet Bell

Free Discharge

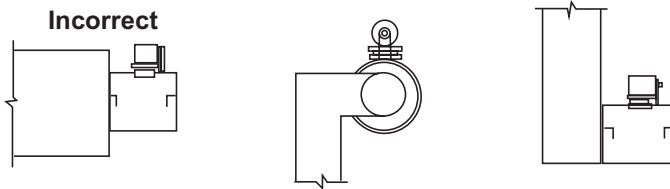
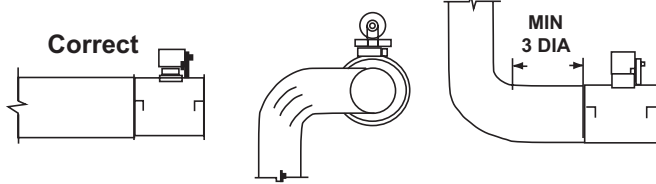
Avoid a free discharge into the plenum. This will result in lost efficiency because it doesn't allow for a static regain.



Free Discharge

Inlet Duct Turns

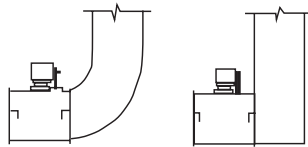
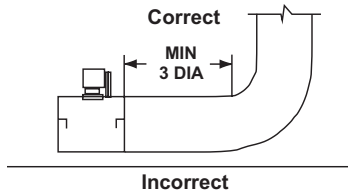
For ducted inlets, allow at least three fan wheel diameters between duct turns or elbows and the fan inlet.



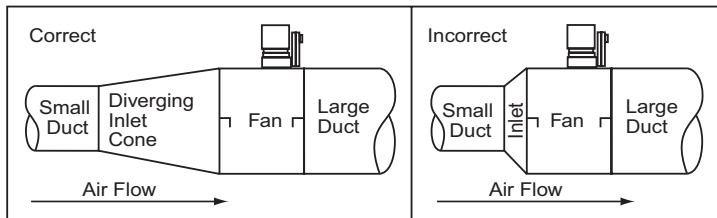
Inlet Duct Turns

Discharge Duct Turns

When possible, allow three duct diameters between duct turns or elbows and the fan outlet.



Discharge Duct Turns



Inlet Cone

Belt and Pulley Installation

Belt tension is determined by the sound the belts make 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. This will result in a different fan speed.

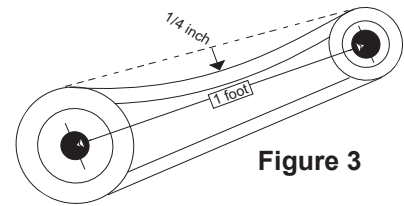


Figure 3

1. Loosen motor plate adjustment bolts and move motor plate in order that the belts can easily slip into grooves on pulleys. Never pry, roll or force the belts over the rim of the pulley.
2. Slide motor plate back 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 3*.
3. Lock the motor plate adjustment nuts in place.
4. Ensure pulleys are properly aligned. Refer to *Figure 4*.

Tolerance

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

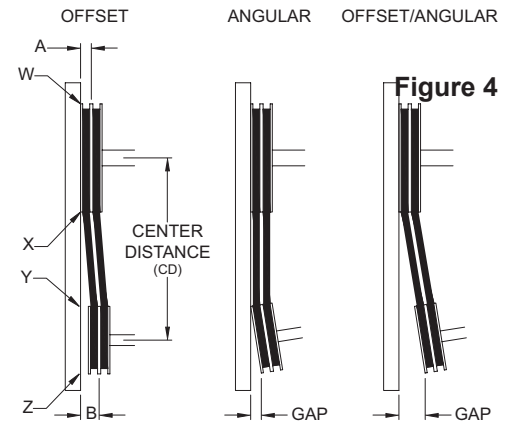


Figure 4

Pulley Alignment

Pulley alignment is adjusted by loosening the motor pulley setscrew and by moving the motor pulley on the motor shaft.

Figure 4 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 (as shown in A & B of *Figure 4*). *Figure 5* illustrates using a carpenter's square to adjust the position of the motor pulley until the belt is parallel to the longer leg of the square.

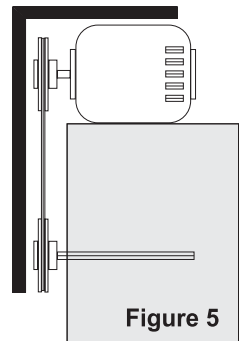


Figure 5

Wiring Installation

Leave enough slack in the wiring to allow for motor movement when adjusting belt tension. Some fractional motors have to be removed in order to make the connection with the terminal box at the end of the motor. To remove motor, remove bolts securing motor base to power assembly. Do not remove motor mounting bolts.

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).



Use of Variable Frequency Drives

Motors

Motors that are to be operated using a Variable Frequency Drive (VFD) must be VFD compatible. At a minimum, this must be a Premium Efficiency motor with Class F insulation. Motors that are not supplied by Loren Cook Company should have the recommendation of the motor manufacturer for use with a VFD.

Grounding

The fan frame, motor and VFD must be connected to a common earth ground to prevent transient voltages from damaging rotating elements.

Wiring

Line reactors may be required to reduce over-voltage spikes in the motors. The motor manufacturer should be consulted for recommended line impedance and usage of line reactors or filters if the lead length between the VFD and the motor exceeds 10 ft (3m).

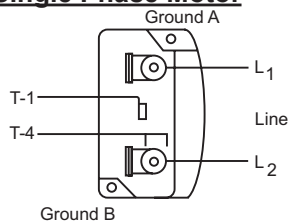
Fan

It is the responsibility of the installing body to perform coast-down tests and identify any resonant frequencies after the equipment is fully installed. These resonant frequencies are to be removed from the operating range of the fan by using the "skip frequency" function in the VFD programming. Failure to remove resonant frequencies from the operating range will decrease the operating life of the fan and void the warranty.

Please refer to *AVA Critical Fan Speed*, page 5. Variable frequency drives should not allow AVA fans to operate between the low and the high speeds list.

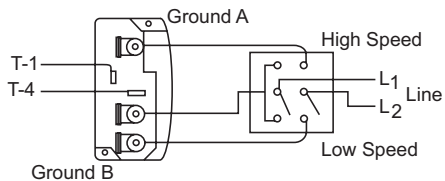
Wiring Diagrams

Single Speed, Single Phase Motor



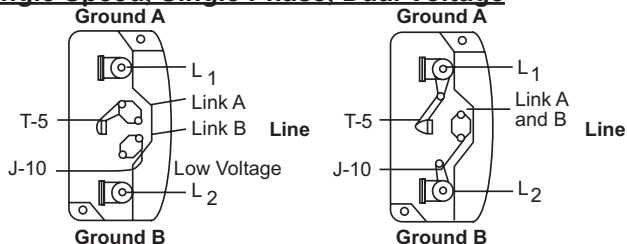
When ground is required, attach to ground A or B with No. 6 thread forming screw. To reverse, interchange T-1 and T-4.

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.

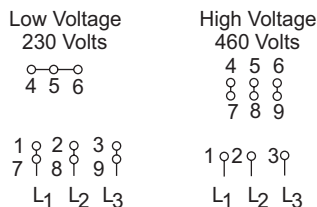
Single Speed, Single Phase, Dual Voltage



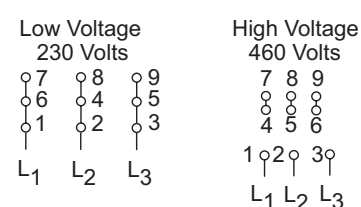
When ground is required, attach to ground A or B with No. 6 thread forming screw. To reverse, interchange T-5 and J-10 leads.

3-Phase, 9 Lead Motor

Y-Connection

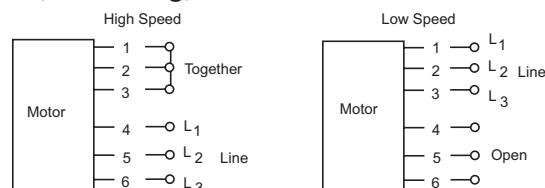


Delta-Connection



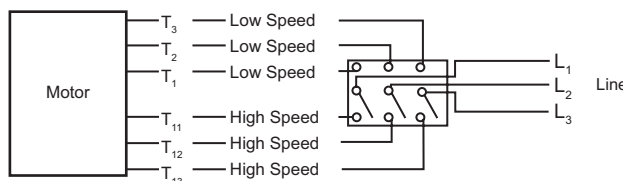
To reverse, interchange any 2 line leads.

2 Speed, 1 Winding, 3-Phase Motor



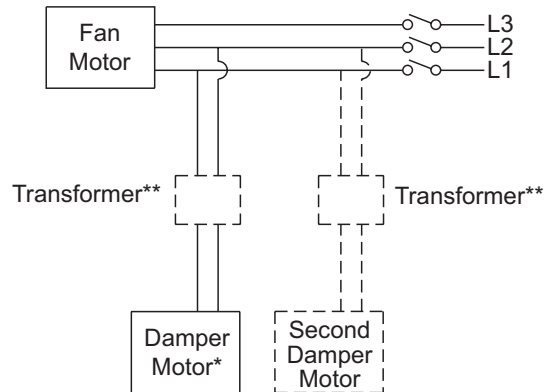
To reverse, interchange any 2 line leads. Motors require magnetic control.

2 Speed, 2 Winding, 3-Phase



To reverse: High Speed: interchange leads T₁₁ and T₁₂. Low Speed: interchange leads T₁ and T₂. Both Speeds: interchange any 2 line leads.

Typical Fan Motor/Damper Motor Schematic



For 3-Phase, damper motor voltage should be the same between L₁ and L₂. For single phase application, disregard L₃.

*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.

Blade Angle Adjustment

Instructions for adjusting blade angle setting on adjustable pitch vane Axial Inline Blowers (AVA):



NOTICE! Verify that the fan at the new pitch does not operate at a critical speed (RPM) see table below.

WARNING: The maximum safe blade angle setting for this fan is shown on the decal located inside the hub cover.

1. Disconnect power supply.
2. Remove hub cover.
3. Placing a bubble protractor on the flat machined surface on the discharge side of the hub, take an initial reading. When setting the blade to the desired angle (no greater than 40°), remember to allow for the angle at which the fan is installed, as indicated by the initial reading.
4. Adjust each blade individually as follows (note that one person should hold and adjust the blade while another tightens the nuts).
5. Place blade in 3 o'clock or 9 o'clock position.
6. Loosen retaining nut on blade bolt.
7. Position bubble protractor on the face (discharge side) of the blade at the indicated line. If the line is not visible, position protractor on a line perpendicular to the blade center line, and 30% of the wheel radius in from the tip on 39", 49", 63" and 79" fans (33% on 35", 44" 55" and 71" fans).
8. Set blade to desired angle, correcting for angle of installation.
9. Tighten nut so that blade is snug.
10. Recheck blade angle. If blade has shifted, tap blade near hub with soft mallet to correct.
11. Tighten nut to tabulate torque (see following Torque chart).
12. Rotate wheel to bring next blade into same position and repeat steps 5-12 until all blades are adjusted.
13. Replace hub cover.
14. Reconnect power supply.

Bolt Size	Torque (FT-LB)*	
	Minimum	Maximum
5/8"	40	110
3/4"	140	190
7/8"	265	350
1"	450	550

*For adjustment of blades only.

Propeller Rotation

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

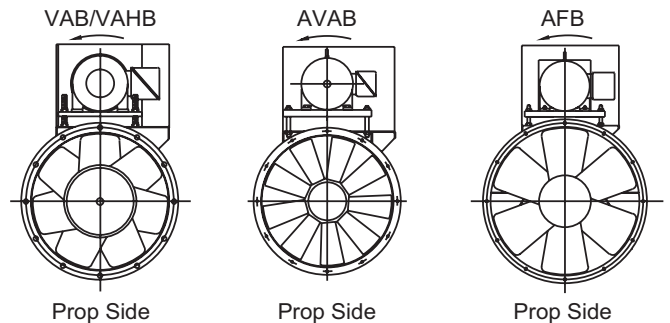
115 and 230 Single Phase Motors

Fan wheel rotation is set correctly at the factory. Changing the rotation of this type of motor should only be attempted by a qualified electrician.

208, 230 and 460 3-Phase Motors

These motors are electrically reversible by switching two of the supply leads. For this reason, the rotation of the fan cannot be restricted to one direction at the factory. See *Wiring Diagrams*, page 4, for specific information on reversing wheel direction.

NOTICE! Do not allow the fan to run in the wrong direction. This will overheat the motor and cause serious damage. For 3-phase motors, if the fan is running in the wrong direction, check the control switch. It is possible to interchange two leads at this location so that the fan is operating in the correct direction.



Prop Side

Prop Side

Prop Side

*Size 54 & 60 rotation is opposite.

AVA Critical Fan Speed (the AVA should not operate between the high and low RPM)

Fan Size	Blade Angle	Fan RPM		Fan Size	Blade Angle	Fan RPM		Fan Size	Blade Angle	Fan RPM		Fan Size	Blade Angle	Fan RPM		Fan Size	Blade Angle	Fan RPM		Fan Size	Blade Angle	Fan RPM							
		Low	High			Low	High			Low	High			Low	High			Low	High			Low	High	Low	High				
35	10	600	615	39	10	370	385	44	10	525	535	57	10	330	340	63	10	215	225	79	10	250	265						
		900	925			565	580			790	800			500	540			370	400			370	400						
		1820	1865			1135	1165			1590	1615			1005	1025			660	680			750	805	750	805				
	13	615	630		13	375	390		13	525	535		13	320	325		13	335	345		13	220	230	13	250	265	13	250	265
		920	945			570	585			790	805			510	520			330	340			375	400		375	400			
		1860	1910			1150	1180			1595	1620			1015	1035			665	680			755	810		755	810			
	16	625	645		16	380	395		16	795	805		16	320	325		16	340	350		16	220	230	16	250	270	16	250	270
		940	965			575	590			530	535			520	530			330	345			380	400		380	400			
		1895	1950			1160	1195			1600	1625			1020	1045			665	685			760	810		760	810			
	19	635	655		19	385	400		19	795	810		19	320	325		19	340	350		19	220	230	19	255	270	19	255	270
		955	980			580	600			530	540			520	525			330	345			380	405		380	405			
		1925	1980			1175	1210			1605	1630			1025	1050			670	685			765	815		765	815			
22	645	660	22	390	405	22	800	810	22	320	325	22	340	350	22	220	230	22	255	270	22	255	270						
	965	995		585	605		530	540		520	535		330	345		385	405		385	405									
	1950	2005		1185	1220		1615	1635		1035	1060		670	690		770	820		770	820									
25	650	670	25	390	410	25	535	545	25	320	325	25	340	350	25	225	235	25	255	270	25	255	270						
	975	1005		590	610		805	815		525	540		330	350		385	405		385	405									
	1970	2050		1195	1230		1620	1645		1040	1065		675	695		775	820		775	820									
28	655	675	28	395	410	28	535	545	28	325	330	28	345	355	28	225	235	28	260	270	28	260	270						
	985	1010		595	615		805	820		525	540		335	350		385	410		385	410									
	1980	2040		1205	1240		1625	1650		1050	1070		675	700		780	825		780	825									
31	655	675	31	400	415	31	540	550	31	325	330	31	345	355	31	225	235	31	260	275	31	260	275						
	985	1015		600	620		810	825		525	540		335	350		390	410		390	410									
	1990	2045		1215	1250		1635	1660		1055	1070		680	700		785	825		785	825									
34	660	675	34	400	420	34	540	550	34	325	335	34	350	360	34	225	235	34	260	275	34	260	275						
	990	1015		605	625		815	825		525	540		340	350		390	410		390	410									
	1995	2045		1220	1250		1640	1670		1060	1075		685	700		790	830		790	830									
37	660	675	37	405	420	37	545	555	37	325	335	37	350	360	37	225	235	37	260	275	37	260	275						
	990	1010		610	625		815	830		525	540		340	350		395	410		395	410									
	1995	2040		1225	1250		1650	1675		1065	1080		690	705		795	830		795	830									
40	655	670	40	410	420	40	545	555	40	325	340	40	350	360	40	225	235	40	265	275	40	265	275						
	985	1005		615	625		820	835		525	540		340	350		395	415		395	415									
	1990	2030		1230	1245		1655	1685		1070	1085		695	705		795	835		795	835									

Final Installation Steps

1. Inspect fasteners and setscrews, particularly fan mounting and bearing fasteners then tighten according to the *Recommended Torque* chart.
2. Inspect for correct voltage with a voltmeter.
3. Ensure all accessories are installed.

Operation

Pre-Start Checks

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

Start-Up

Turn on the fan. In variable speed units, 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)
- Improper motor amperage or voltage

NOTICE! 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 12.



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	-	-

This table is not to be used for blade angle adjustment. Refer to 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 *Conditions Chart*.

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

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 inspections be conducted twice per year:

- Inspect bolts and setscrews for tightness. Tighten as necessary.
- Inspect belt wear and alignment. Replace worn belts with new belts and adjust alignment as needed. Refer to *Belt and Pulley Installation*, page 3.
- Bearings should be inspected as recommended in the *Lubrication Conditions Chart*.
- Inspect springs and rubber isolators for deterioration and replace as needed.
- 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

Fan Bearings

NOTICE! The fan bearings are provided prelubricated. Any specialized lubrication instructions on fan labels supersedes information provided herein. Bearing grease is a petroleum lubricant in a lithium base conforming to an NLGI #2 consistency. If user desires to utilize another type of lubricant, they take responsibility for flushing bearings and lines, and maintaining a lubricant that is compatible with the installation.



Vane Axial bearings are lubricated through a grease fitting on the exterior of the fan housing and should be lubricated by the schedule, *Lubrication Conditions Chart*.

For best results, lubricate the bearing while the fan is in operation. Pump grease in slowly until a slight bead forms around the bearing seals. Excessive grease can burst seals thus reducing bearing life.

Before lubricating, the grease nipple and immediate vicinity should be thoroughly cleaned without the use of high pressure equipment. The grease should be supplied slowly as the bearing rotates until fresh grease slips past the seal. Excessive pressure should be avoided to prevent seal damage.

Use no more than three injections with a hand-operated grease gun.

Lubrication Conditions Chart

Fan Class	Fan Status	Fan Operating Temperature (F°)	Maximum Interval (operation hrs)
Inlet Vane Axial Blowers	Normal Conditions (clean, dry & smooth)	up to 120	4500
		121-160	1500
		161-200	700
	Extreme Conditions (dirty/wet/rough)	201-400 (*)	200
		up to 160	700
		161-200	400
		201-400 (*)	200

*Exceptions to the greasing interval chart:

- **Periodic Applications (any break of one week or more):** it is recommended that full lubrication be performed prior to each break in operation.
- **Higher Temperature:** it is recommended to halve the intervals for every 30°F increase in operating temperature above 120°F not to exceed 230°F for standard bearings; high temperature bearings (optional) can operate up to 400°F.
- **Vertical Shaft:** it is recommended that the intervals should be halved.

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

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 contaminants, 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 table below.

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	Over 1800 RPM
Standard	3 yrs.	6 months	2 yrs.	6 months	1 yr.	3 months
Severe	1 yr.	3 months	1 yr.	3 months	6 months	1 month

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

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.

Changing Shaft Speed

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

1. Loosen setscrew on driver (motor) pulley and remove key, if equipped.
2. 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.
3. 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.

Pulley and Belt Replacement

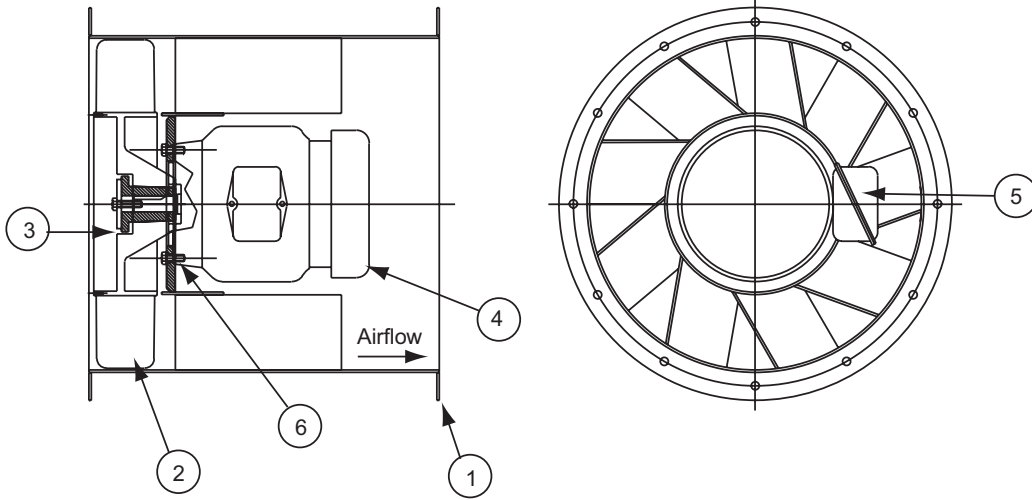
1. Remove pulleys from their respective shafts.
2. Clean the motor and fan shafts.
3. Clean bores of pulleys & coat the bores with heavy oil.
4. Remove grease, rust or burrs from the pulleys and shafts.
5. Remove burrs from shaft by sanding.
6. Place fan pulley on the fan shaft and the motor pulley on the motor shaft. Damage to the pulleys can occur when excessive force is used in placing the pulleys on their respective shafts.
7. Tighten in place.
8. Install belts on pulleys and align as described in *Belt and Pulley Installation*.

Bearing Replacement

1. Loosen and remove belts by lowering motor mounting plate with the four adjusting nuts.
2. Remove the bearing cover. **Do not remove fan sheave yet.**
3. Remove prop by loosening setscrews and retaining bolts and sliding off shaft.
4. Record the location of the fan sheave from end of shaft, and remove the sheave.
5. Record the distance from the bearing to the end of the shaft.
6. Loosen setscrews on bearings and remove shaft.
7. Remove bearings and replace with new bearings.
8. Slide shaft through bearings until shaft protrudes the same amount as original shaft. Tighten setscrews.
9. Replace fan sheave in original location.
10. Replace prop but do not tighten yet.
11. Slide prop on shaft and center prop.
12. Replace and tighten belts.
13. Test run the fan.
14. Re-tighten setscrews on bearings, sheave and prop. Recheck belt tension and adjust as needed.
15. Replace bearing cover.

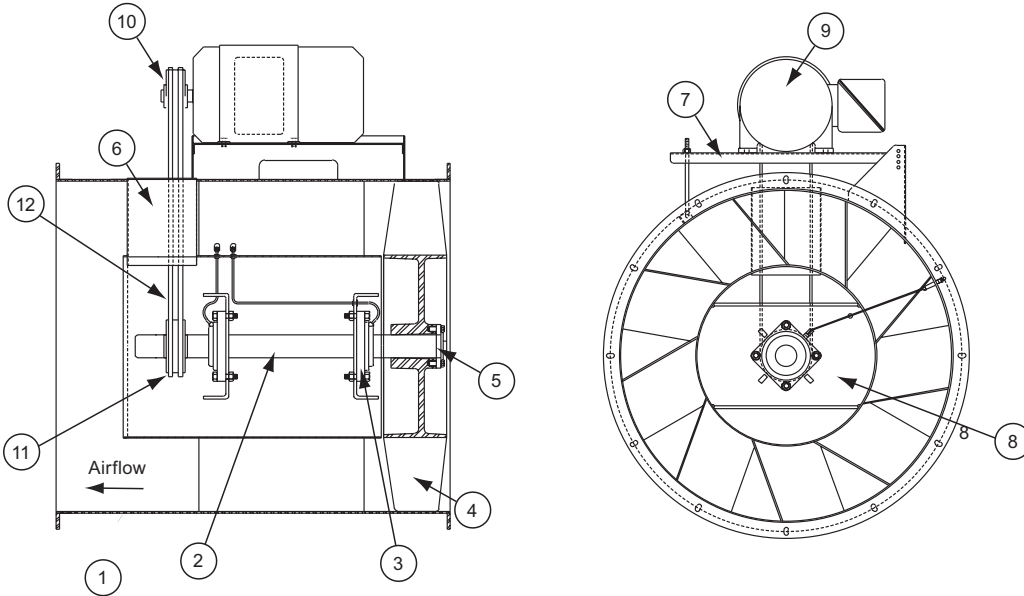
Parts List

VAD



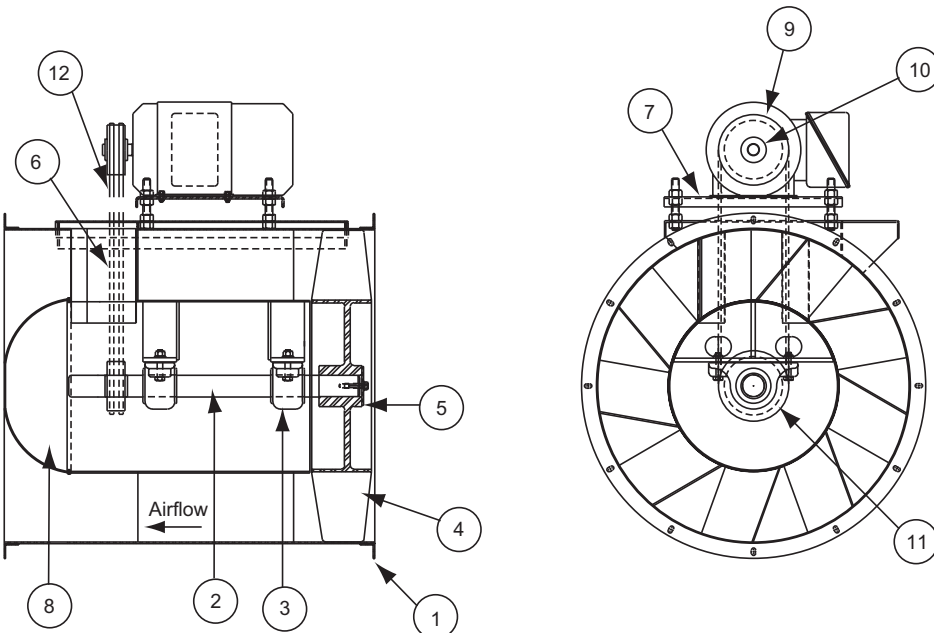
Part No.	Description
1	Drum Weldment
2	Propeller Fixed Pitch
3	Propeller Bushing
4	Motor
5	Wiring Box
6	Motor Mounting Bolts

VAB



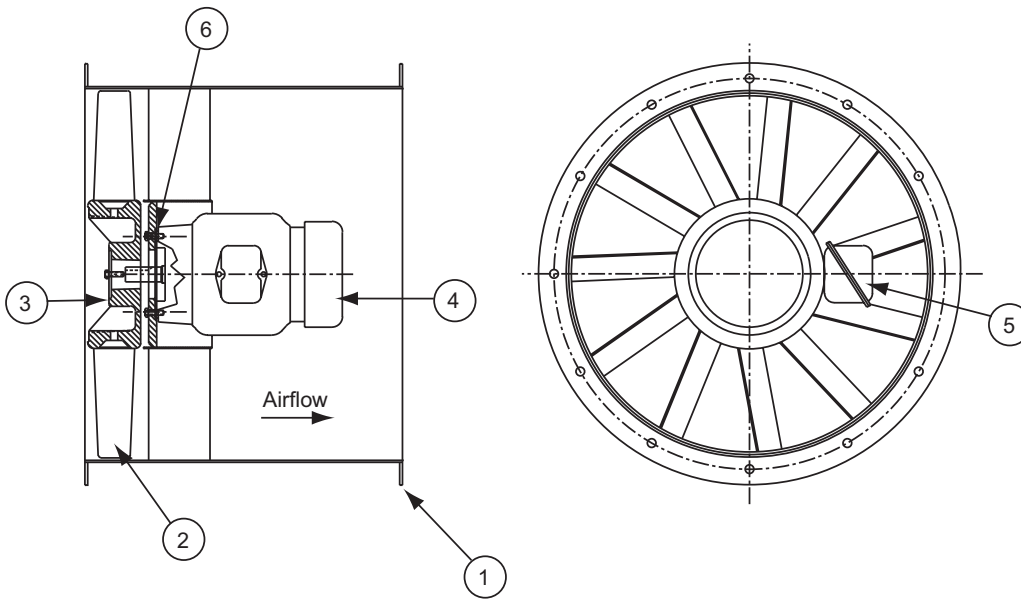
Part No.	Description
1	Drum Weldment
2	Shaft
3	Bearing (2)
4	Propeller
5	Propeller Bushing
6	Belt Tunnel
7	Motor Plate
8	Inner Drum Nose
9	Motor
10	Drive Sheave
11	Driven Sheave
12	Belt

VAHB



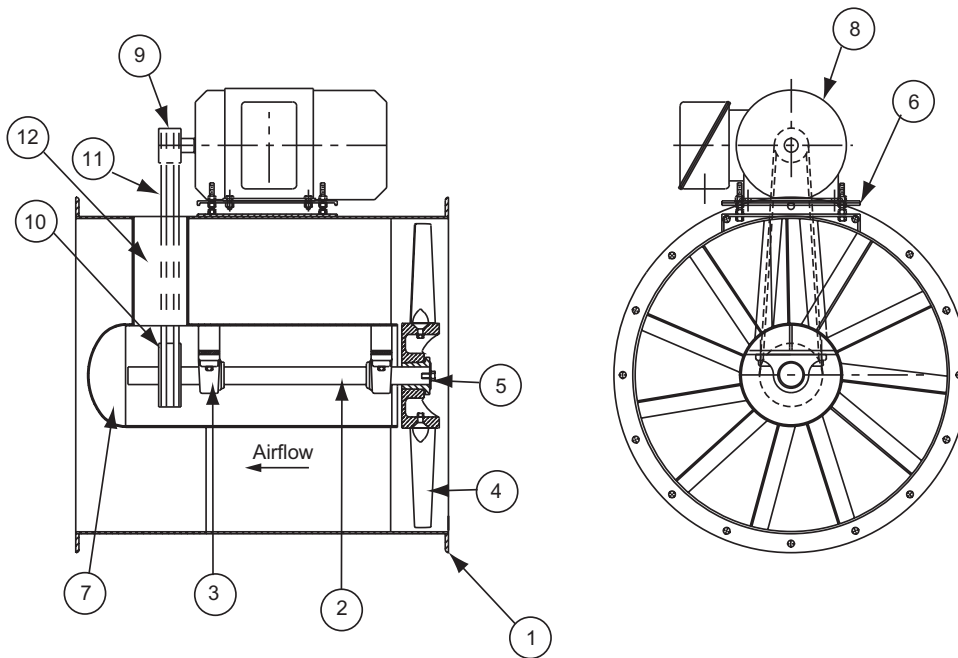
Part No.	Description
1	Drum Weldment
2	Shaft
3	Bearing (2)
4	Propeller
5	Propeller Bushing
6	Belt Tunnel
7	Motor Plate
8	Inner Drum Nose
9	Motor
10	Drive Sheave
11	Driven Sheave
12	Belt

AVAD



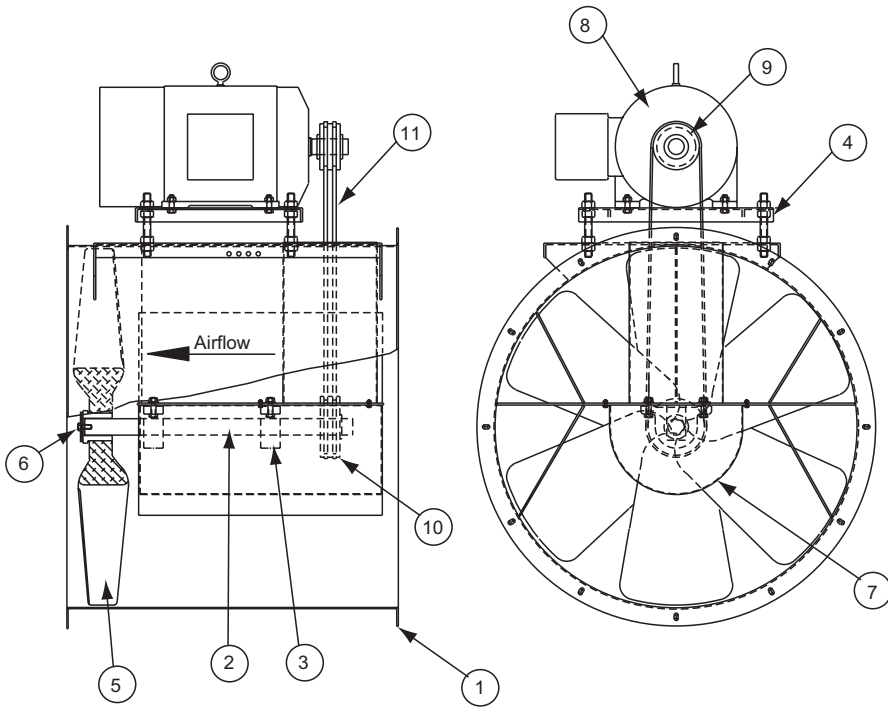
Part No.	Description
1	Drum Weldment
2	Propeller
3	Propeller Bushing
4	Motor
5	Wiring Box
6	Motor Mounting Bolts

AVAB



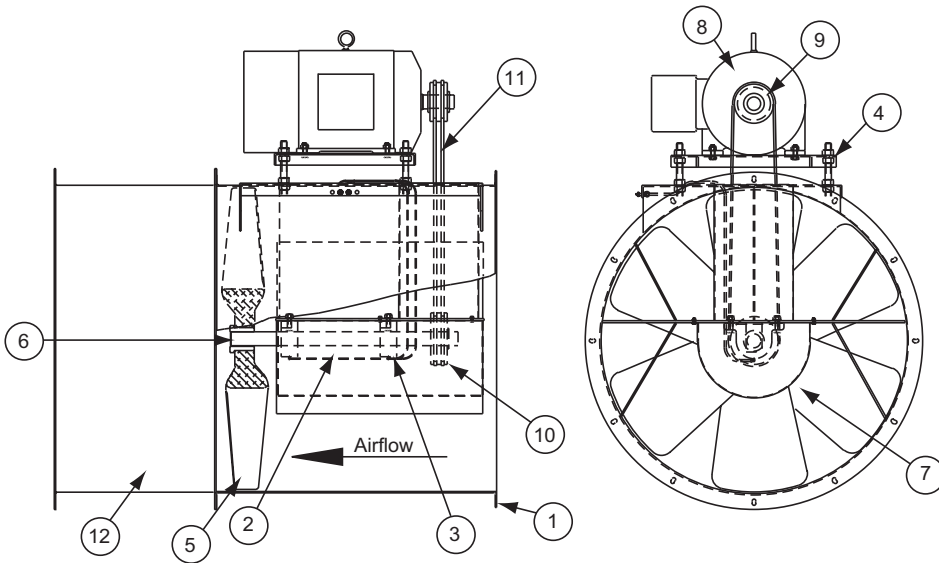
Part No.	Description
1	Drum Weldment
2	Shaft
3	Bearing
4	Propeller
5	Propeller Bushing
6	Motor Plate
7	Inner Drum Nose
8	Motor
9	Drive Sheave
10	Driven Sheave
11	Belt
12	Belt Tunnel (2)

AFB



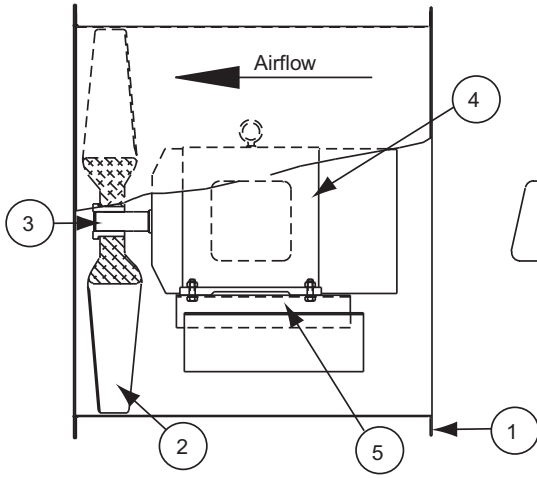
Part No.	Description
1	Drum Weldment
2	Shaft
3	Bearing
4	Motor Plate
5	Propeller C-Cast Bushing H-High Temperature Construction S-Stainless Steel Construction
6	Propeller Bushing
7	Bearing Cover
8	Motor
9	Drive Sheave
10	Driven Sheave
11	Belt

AFBV



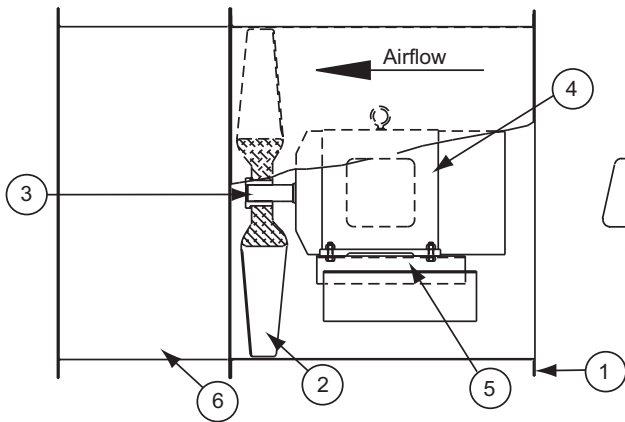
Part No.	Description
1	Drum Weldment
2	Shaft
3	Bearing
4	Motor Plate
5	Propeller C-Cast Bushing H-High Temperature Construction S-Stainless Steel Construction
6	Propeller Bushing
7	Bearing Cover
8	Motor
9	Drive Sheave
10	Driven Sheave
11	Belt
12	Vane Section

AFD-C



Part No.	Description
1	Drum Weldment
2	Propeller
3	Prop Bushing
4	Motor
5	Motor Mounting Box

AFDV-C



Part No.	Description
1	Drum Weldment
2	Propeller
3	Prop Bushing
4	Motor
5	Motor Mounting Box
6	Vane Section

Troubleshooting

Problem and Potential Cause

Low Capacity or Pressure:

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

Excessive Vibration and Noise:

- Damaged or unbalanced wheel.
- Belts too loose; worn or oily belts.
- Speed too high.
- Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly.
- Bearings need lubrication or replacement.
- Fan surge or incorrect inlet or outlet condition.

Overheated Motor:

- Motor improperly wired.
- Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly.
- Cooling air diverted or blocked.
- Improper inlet clearance.
- Incorrect fan RPMs.
- Incorrect voltage.

Overheated Motor:

- Improper bearing lubrication
- Excessive belt tension.

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. For fans provided with motors, the motor manufacturer warrants motors for a designated period stated in the manufacturer's warranty. Warranty periods vary from manufacturer to manufacturer. Should motors furnished by Loren Cook Company prove defective during the designated period, they should be returned to the nearest authorized motor service station. Loren Cook Company will not be responsible for any removal or installation costs.



LOREN COOK COMPANY

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