



# CPS - Cook

## Exhaust fan Installation and Maintenance Instructions

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### INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

This publication contains the installation, operation and maintenance instructions for standard units of the CA/CF/CP-Centrifugal Blowers.

- CA/CF SWSI
- CA DWDI
- CA-4 SWSI
- CA-4 DWDI
- CPFD
- CPFB
- CPA/CPA-A/CPVS/CPV-A/CPV

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

Loren Cook catalog, CA, CF, CPV, CPS/CPV-A, CPA/CPA-A, and CPFD-CPFB, 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 Loren Cook Company by phoning (417)869-6474, extension 166; by FAX at (417)832-9431; or by e-mail at info@lorencook.com.

For information on special equipment, contact Loren Cook Company Customer Service Department 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.
- Inspect dampers (if supplied) for free operation of all moving parts.
- Record on the *Delivery Receipt* any visible sign of damage.

#### WARNING

This unit has rotating parts. Safety precautions should be exercised at all times during installation, operation, and maintenance.  
**ALWAYS disconnect power prior to working on fan.**

### Handling

Lift the fan by the base or lifting eyes. **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 5). Rotate the wheel several revolutions every three to five days to keep a coating of grease on all internal bearing parts.

Store the fan in its original 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, follow the additional instructions below.

- Coat the shaft with grease or a rust preventative compound.
- Wrap bearings for weather protection.
- Cover the inlet and outlet to prevent the accumulation of dirt and moisture in the housing.
- Periodically rotate the wheel and operate dampers (if supplied).
- Periodically inspect the unit to prevent damaging conditions.

#### Personal Safety

**Disconnect switches are recommended. Place the disconnect switch 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.**

### Installation

#### Motor Installation

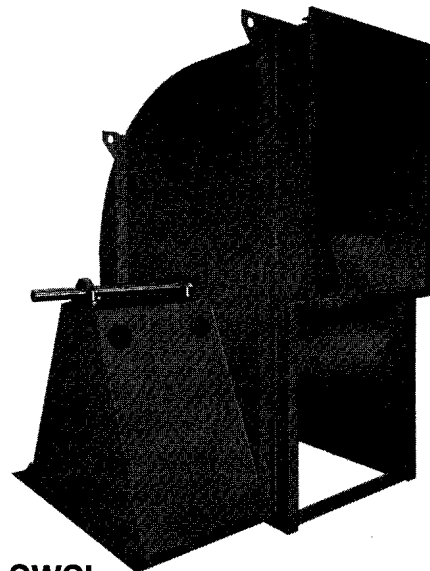
Most motors are shipped mounted on the fans with belts and drives installed. However, extremely heavy motors and drives are shipped separately. These motors and drives will require field installation. Please refer to pages 4.

#### Foundation

This fan requires a strong, level foundation of reinforced poured concrete. A correctly designed concrete foundation provides the best means for mounting floor units. The foundation's size is determined by fan size and arrangement, motor size and position, and the specific location of the installation.

Use the following guidelines to calculate foundation size:

- The overall dimensions of the foundation should extend



CA SWSI

**Foundation continued**

at least 6 inches beyond the outline of the fan and its motor.

- The weight of the foundation should be 2 to 3 times the weight of the unit and its motor.

**Isolation**

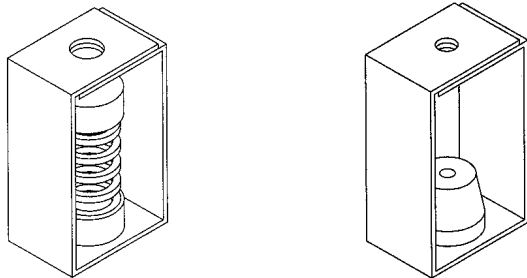
**Isolation Base**

To prevent vibration and noise from being transferred to the building isolators are recommended. Arrangement 1, 2, & 3 (CA or CF) fans require an isolation base to effectively isolate the fan system which includes the fan, base, motor, drive, guards, etc. Bases must have sufficient rigidity to resist belt pull and prevent drive distortion which can lead to excessive belt and bearing wear; its perimeter should contain all base angles and rotating parts. Arrangement 9 or 10 fans (CA, CF, and CP) above size 270 require isolation rails. Please consult factory for isolation of arrangement 9 fans due to the potential of uneven loading caused by the motors and drives. Isolators should be located between the fan system and the support structure.

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

**Ceiling Mounted Isolators**

Some applications require fan systems designed for floor mounting to be suspended from ceiling supports. In such cases, all CA, CF, or CP fans of all arrangements should be installed on either rails or bases in the classical orientation. Typically, these systems are hung from the corners by rods, which include isolation hangers of either spring or rubber-in-shear design. ***Under no circumstances is the fan to be inverted and hung by its base angles.***

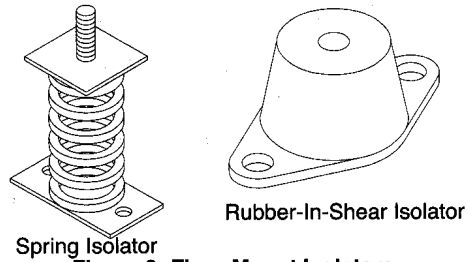


Ceiling Mounted Spring Isolator      Rubber-In-Shear Ceiling Isolators  
**Figure 1 - Ceiling Mount Isolators**

**Floor Mounted Spring Isolators**

- Mount fan and motor on isolation base (if supplied).
- Elevate fan (or isolation base) to operating height and insert blocks to hold in position.
- 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.
- Adjust the isolators by turning the leveling nut counter clockwise 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.
- Turn lock nut onto leveling bolt and secure firmly in place against the top of the mounting flange or frame.

f. Secure isolators to mounting surface.



**Figure 2 - Floor Mount Isolators**

**Floor Mounted Rubber-In-Shear (RIS) Isolators**

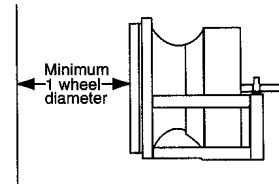
- Mount fan and motor on an isolation base (if supplied).
- Elevate fan to provide room to insert isolators between the base and foundation and block in position.
- Position isolators under fan and secure bolts.
- Remove blocks and allow fan to rest on floor. Isolators must be installed on a level surface (leveling should not be required).
- Secure isolators to mounting surface.

**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**

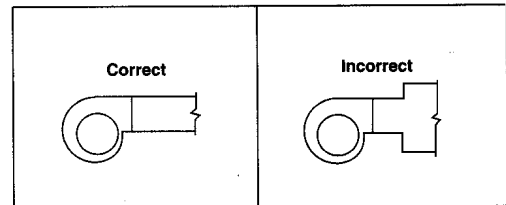
If your fan has an open inlet (no duct work), the fan must be placed 1 fan wheel diameter away from walls and bulk-heads.



**Figure 2 - Non-ducted Inlet Clearance**

**Free Discharge**

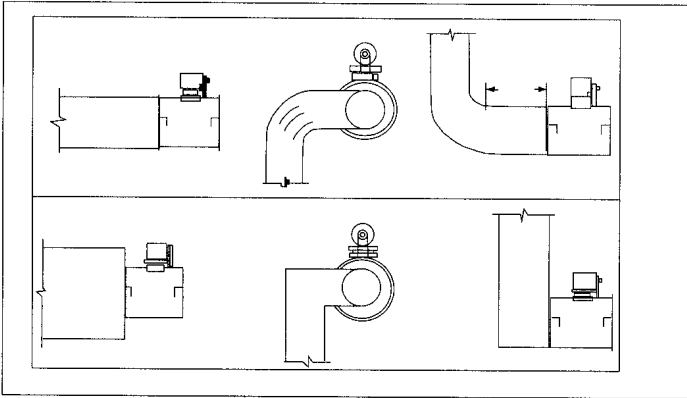
Avoid a free discharge into the plenum. This will result in lost efficiency because it doesn't allow for a static regain.



**Free Discharge**

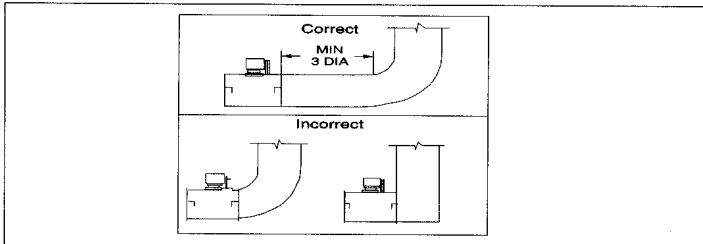
## Inlet Duct Turns

For ducted inlets, allow at least 3 fan wheel diameters between duct turns or elbows and the fan inlet.



## Discharge Duct Turns

Where possible, allow 3 duct diameters between duct turns or elbows and the fan outlet. Refer to figure above.



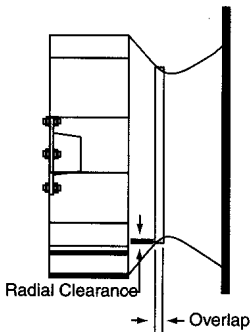
Discharge Duct Turns

## 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 for correct overlap.

Adjust the overlap by loosening the wheel hub and moving the wheel along the shaft to obtain the correct value.

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

Size	Maximum Overlap	Size	Maximum Overlap
100	5/8"	300	1"
120		330	
135		365	
150		402	
165		445	
180		490	
195		540	1-1/4"
210	600		
225	660		
245	730		
270	3/4"		

## 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.

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

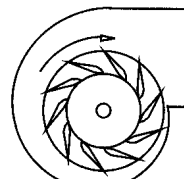
Leave enough slack in the wiring to allow for motor movement when adjusting belt tension. Some fractional motors have to be removed in order to make the connection with the terminal box at the end of the motor. To remove motor, remove bolts securing motor base to power assembly. Do not remove motor mounting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

Units with Arrangement 10 have a hole provided at the base of the bearing pedestal to accommodate wiring.

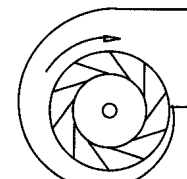
### Personal Safety

**Disconnect switches are recommended. Place the disconnect switch 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.**

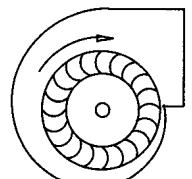
**Follow the wiring diagram in the disconnect switch and the wiring diagram provided with the motor. Correctly label the circuit on the main power box and always identify a closed switch to promote safety (i.e., red tape over a closed switch).**



Airfoil



Backward Inclined



Forward Curved

## Wheel 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 above for specific information on reversing wheel direction.

**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.**

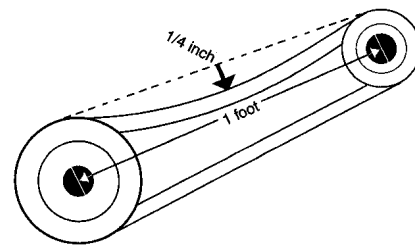


Figure 3

## Belt and Pulley Installation

Belt tension is determined by the sound the belts make when the fan is first started. Belts will produce a loud squeal which dissipates after the fan is operating at full capacity. If the belt tension is too tight or too loose, lost efficiency and possible damage can occur.

## Belt and Pulley Installation continued

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

- Loosen motor plate adjustment nuts on L-bolts 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.
- Slide the 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*.
- Lock the motor plate adjustment nuts in place.
- Ensure pulleys are properly aligned. Refer to *Figure 4*.

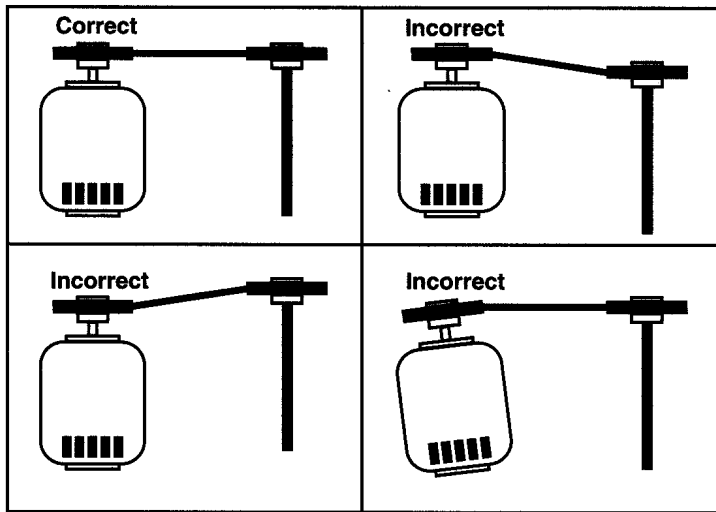


Figure 4

## Pulley Alignment

Pulley alignment is adjusted by loosening the motor pulley setscrew and by moving the motor pulley on the motor shaft or by moving the entire motor along the motor mounting bracket.

*Figure 4* illustrates correct and incorrect pulley alignment. A recommended method of inspecting the pulley alignment is shown in *Figure 5*. With the shorter leg of a carpenter's square or other straight edge lying along the case of the motor, adjust the position of the motor pulley (or the motor until the longer leg of the square is parallel to the belt.

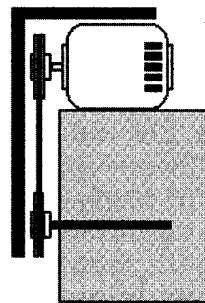


Figure 5

## Final Installation Steps

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

## Operation

### Pre-Start Checks

- Lock out all the primary and secondary power sources.
- Ensure fasteners and setscrews, particularly those used for mounting the fan, are tightened.
- Inspect belt tension and pulley alignment.
- Inspect motor wiring.
- Ensure belt touches only the pulleys.

- Ensure fan and ductwork are clean and free of debris.
- Inspect wheel-to-inlet clearance. The correct wheel-to-inlet clearance is critical to proper fan performance.
- Close and secure all access doors.
- Restore power to the fan.

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

Size	Key Hex Across Flats	Setscrews		Hold Down Bolts	
		Recommended Torque Inch-lbs.		Size	Wrench Torque (Inch-lbs)
		Min.	Max.		
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	2040
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

## Start Up

Turn the fan on. 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.

**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.**

## 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.

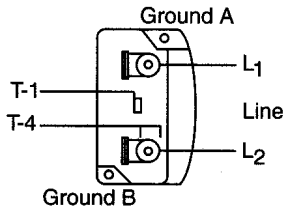
Regular inspections are recommended for fans exhausting non-contaminated air.

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

- Inspect bolts and setscrews for tightness. Tighten as necessary. Worn setscrews should be replaced immediately.

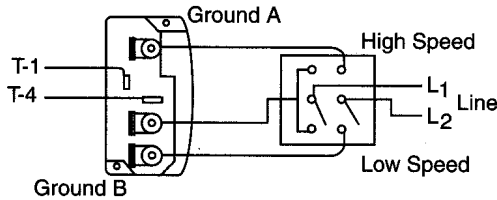
# Wiring Diagrams

## Single Speed, Single Phase Motor



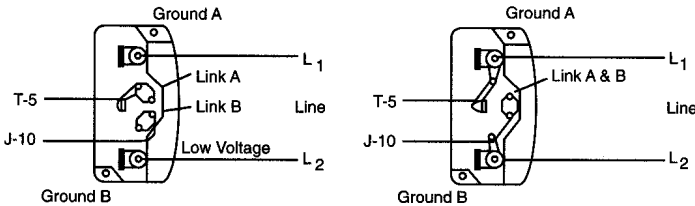
When ground is required, attach to ground A or B with no. 6 thread forming screw. To reverse, interchange T-1 and T-4.

## 2 Speed, 2 Winding, Single Phase Motor



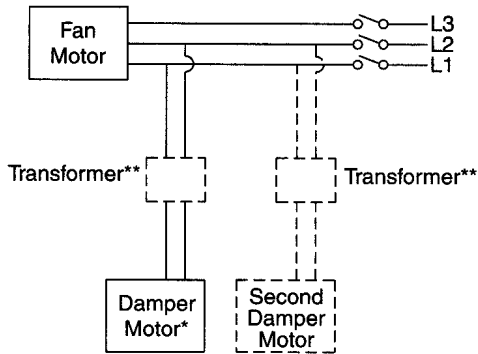
When ground required, attach to ground A or B with No. 6 thread forming screw. To reverse, interchange T-1 and T-4 leads.

## Single Speed, Single Phase, Dual Voltage



When ground 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



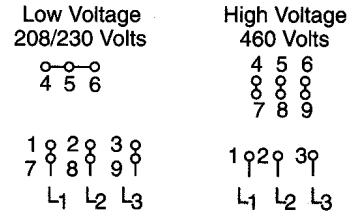
For 3 phase, damper motor voltage should be the same between L<sub>1</sub> and L<sub>2</sub>. For single phase application, disregard L<sub>3</sub>. \*Damper motors may be available in 115, 230 and 460 volt models. The damper motor nameplate voltage should be verified prior to connection. \*\* A transformer may be provided in some installations to correct the damper motor voltage to the specified voltage.

## Maintenance continued

- Inspect belt wear and alignment. Replace worn belts with new belts and adjust alignment as needed. See *Belt and Pulley Installation*, page 3.
- Bearings should be inspected as recommended in the *Conditions Chart*.
- Inspect variable inlet vanes for freedom of operation and excessive wear. The vane position should agree with the position of the control arm. As the variable inlet vanes close, the entering air should spin in the same direction as the wheel.
- 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 prevent imbalance and damage.

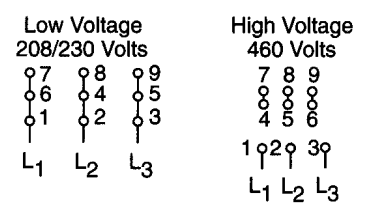
# Wiring Diagrams

## 3 Phase, 9 Lead Motor Y-Connection

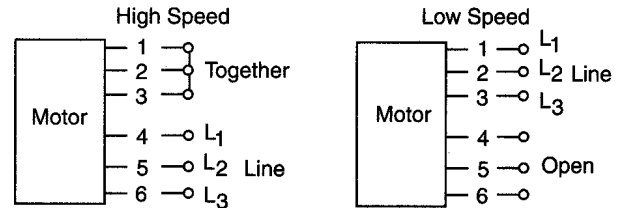


To reverse, interchange any 2 line leads.

## 3 Phase, 9 Lead Motor Delta-Connection

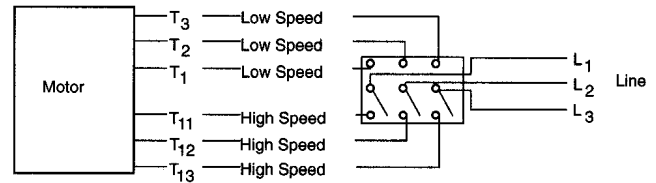


## 2 Speed, 1 Winding, 3 Phase Motor



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

## 2 Speed, 2 Winding, 3 Phase



To reverse: High Speed-interchange leads T<sub>11</sub> and T<sub>12</sub>. Low Speed-interchange leads T<sub>1</sub> and T<sub>2</sub>. Both Speeds-interchange any 2 line leads.

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

## Lubricants

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.

A NLGI grade 2 grease is a light viscosity, low-torque,

## Lubricants continued

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.

## Fan Bearings

Greaseable fan bearings are lubricated through a grease fitting on the bearing and should be lubricated by the schedule, *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.

In the event 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 fans with motors up to and including 5 HP (184T max.) 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.

## Pulley and Belt Replacement

- Remove pulleys from their respective shafts.
- Clean the motor and fan shafts.
- Clean bores of pulleys and coat the bores with heavy oil.
- Remove grease, rust, or burrs from the pulleys and shafts.
- Remove burrs from shaft by sanding.
- Place fan pulley on fan shaft and motor pulley on its shaft. Damage to the pulleys can occur when excessive force is used in placing the pulleys on their

## Maximum RPM

CA SWSI, CPS-A, CPA-A, Size	Maximum RPM		
	Class I	Class II	Class III
120	3948	5151	6490
135	3508	4577	5766
150	2749	3587	4519
165	2509	3273	4124
180	2150	2805	3534
195	1987	2592	3266
210	1841	2402	3026
225	1712	2234	2814
245	1608	2098	2643
270	1418	1850	2331
300	1276	1665	2097
330	1162	1516	1910
365	1065	1389	1751
402	964	1258	1585
445	873	1139	1435
490	793	1035	1303
540	719	938	1182
600	648	845	1065
660	587	766	965
730	532	694	874

CA DWDI Size	Maximum RPM		
	Class I	Class II	Class III
120	3714	4846	6105
135	3307	4315	5436
150	2751	3589	4522
165	2501	3263	4111
180	2176	2839	3577
195	2010	2622	3304
210	1866	2435	3067
225	1741	2271	2862
245	1631	2128	2681
270	1443	1883	2372
300	1262	1647	2074
330	1147	1496	1885
365	1038	1354	1706
402	941	1228	1547
445	851	1110	1399
490	773	1009	1271
540	702	916	1164
600	631	823	1037
660	574	749	944
730	519	677	853

## Maximum RPM

CF SWSI, CPS, CPA, Size	Maximum RPM		
	Class I	Class II	Class III
60-100*	4231	-	-
120	3692	4817	6069
135	2953	3853	4854
150	2656	3465	4366
165	2414	3150	3968
180	2389	3117	3927
195	2204	2876	3623
210	1786	2330	2936
225	1659	2164	2727
245	1532	1999	2518
270	1391	1815	2286

CF SWSI, CPS, CPA, Size	Maximum RPM		
	Class I	Class II	Class III
300	1251	1632	2056
330	1141	1489	1876
365	1022	1333	1680
402	936	1221	1539
445	846	1104	1391
490	770	1005	1266
540	699	912	1149
600	629	821	1034
660	572	746	940
730	517	675	850

\*Sizes 60 through 100 only applies to CPS and CPA.

## Maximum RPM

CPV Size	Maximum RPM
60-100	2719
120	2527
135	2093
150	2035
165	1766
180	1588
195	1571
210	1407
225	1265

CPV Size	Maximum RPM
245	1260
270	1091
300	1006
330	869
365	805
402	701
445	660
490	576

## RPM Derating Factor

Steel	
Temperature (°F)	RPM
70	1.00
200	0.98
300	0.96
400	0.94
500	0.91
600	0.87
700	0.81
800	0.75

Aluminum	
Temperature (°F)	RPM
70	1.00
200	0.93
300	0.79

For elevated airstream temperatures, the maximum fan speed limits must be derated by the factors above.

respective shafts.

g. Tighten in place.

h. Install belts on pulleys and align as described in the *Belt and Pulley Installation* section.

## Bearing Replacement

The fan bearings are pillow block ball bearings.

An emery cloth or file may be needed to remove imperfections in the shaft left by the setscrews.



## Bearing Replacement continued

### Arrangement 1,2, 9 and 10

- a. Mark the position on the shaft of both bearing races, setscrews, and the wheel and pulley. Mark the location and orientation of the inlet cone. Note the clearance between the wheel and inlet cone.
- b. Remove the fan pulley.
- c. Remove the inlet cone.
- d. Remove the wheel from the shaft. A 2-jaw puller may be needed.
- e. Remove bearing hold-down bolts. Remove shaft and bearings as one unit.
- f. Remove the anti-corrosion coating from the shaft with a suitable degreaser.
- g. Remove the bearing from the shaft using a bearing puller. If a bearing puller is not available, tap on the bearing with a wood block and hammer to remove it.
- h. Smooth and clean the shaft and bearing bore thoroughly.
- i. Place the bearings into position making sure they are not on a worn section of the shaft. Tapping the inner ring face with a soft driver may be required. **Do not hammer on the housing.**
- j. The outer ring of the bearing is spherical and swivels in the housing to compensate for misalignment. Secure hold-down bolts, but **do not fully tighten.**
- k. Align the setscrews on the bearings and tighten one setscrew on each bearing.
- l. Rotate the shaft to allow the bearing outer rings to find their center of free movement.
- m. Install the wheel on the shaft. Install the inlet cone in its original location. And adjust bearing position and inlet cone to center the wheel in the inlet cone.
- n. Tighten hold-down bolts to proper torque.
- o. Turn the shaft by hand. Resistance should be the same as it was before hold-down bolts were fully tightened.
- p. Tighten bearing setscrews to specified torque. Refer to Torque chart.
- q. Re-install the pulley and adjust the belt tension.
- r. Test run and retighten all setscrews and bolts; trim balance as necessary (.0785 in/sec max.).

After 24 hours of operation, retighten the setscrews to the appropriate torque. This assures full locking of the inner race to the shaft. Make sure the socket key or driver is in good condition with no rounded corners. The key should be fully engaged in the setscrew and held squarely to prevent rounding out of the setscrew socket when applying maximum torque.

### Arrangement 3 Bearing Replacement

Bearings should be replaced individually for each side of fan.

- a. Loosen and remove belts.
- b. If replacing drive side bearing, mark location of pulley and then remove.
- c. Mark bearing location on bearing support and loosen bearing hold down bolts.
- d. Support shaft to remove weight from bearing.
- e. Remove anti-corrosion coating from the shaft with a suitable de-greaser.
- f. Remove bearing from the shaft using a bearing puller.

If a bearing puller is not available, tap on the bearing with a wood block and hammer to remove it.

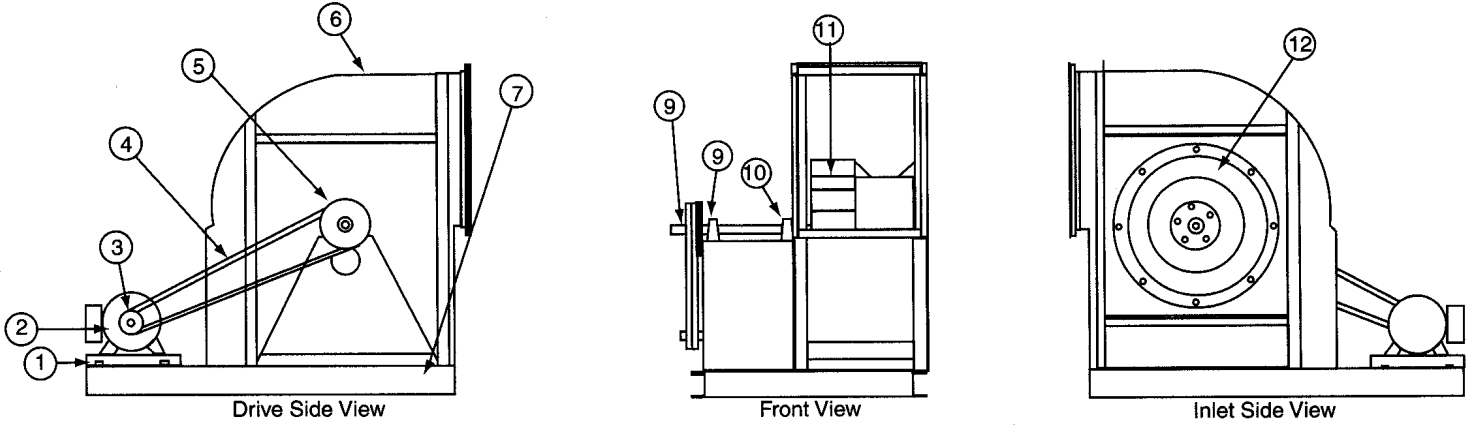
- g. Smooth and clean the shaft and bearing bore thoroughly.
- h. Place the bearing into position making sure it is not on a worn section of the shaft. Tapping the inner ring face with a soft driver may be required. Do not hammer on the housing.
- i. The outer ring of the bearing is spherical and swivels in the housing to compensate for misalignment. Secure hold-down bolts, but do not fully tighten.
- j. Align setscrews on the bearings and tighten one set-screw on bearing.
- k. Rotate the shaft to allow the bearing outer ring to find its center of free movement.
- l. Tighten hold-down bolts to proper torque. Refer to Torque chart.
- m. Turn the shaft by hand. Resistance should be the same as it was before hold-down bolts were fully tightened.
- n. Tighten bearing setscrews to specified torque.
- o. Re-install the pulley if required.
- p. Repeat process for opposite bearing.
- q. Adjust the belt tension.
- r. Test run and retighten all setscrews and bolts; trim balance as necessary (.0785 in/sec max.).

After 24 hours of operation, retighten the setscrews to the appropriate torque. This assures full locking of the inner race to the shaft. Make sure the socket key or driver is in good condition with no rounded corners. The key should be fully engaged in the setscrew and held squarely to prevent rounding out of the setscrew socket when applying maximum torque.

## Troubleshooting

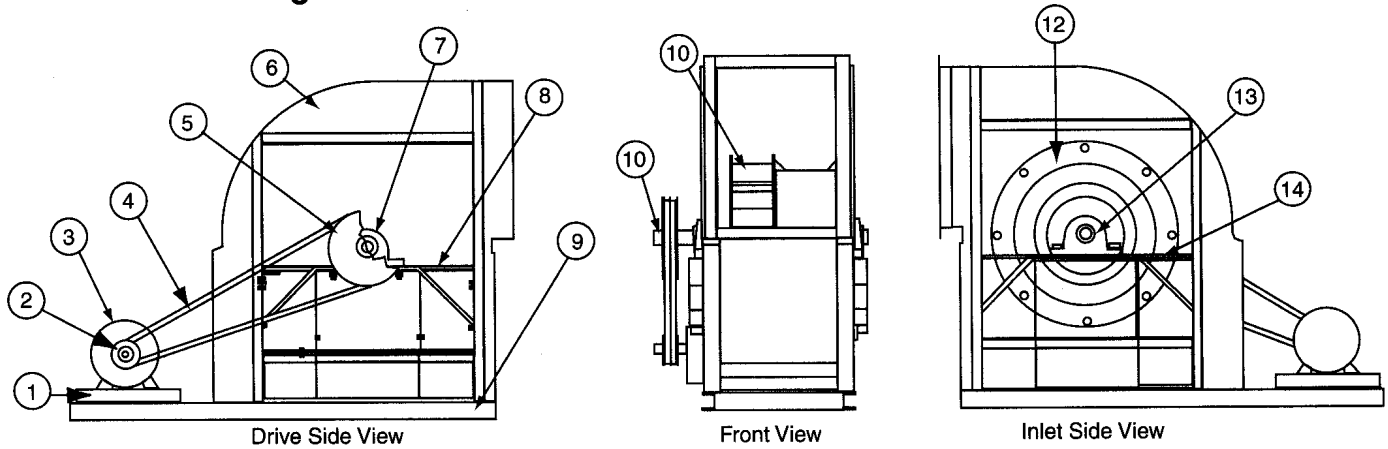
Problem and Potential Cause
<b>Low Capacity or Pressure</b> <ul style="list-style-type: none"><li>•Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly.</li><li>•Poor fan inlet conditions. There should be a straight clear duct at the inlet.</li><li>•Improper wheel alignment.</li></ul>
<b>Excessive Vibration and Noise</b> <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 or incorrect inlet or outlet condition.</li></ul>
<b>Overheated Motor</b> <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>
<b>Overheated Bearings</b> <ul style="list-style-type: none"><li>•Improper bearing lubrication</li><li>•Excessive belt tension.</li></ul>

### CA/CF SWSI Arrangement 1 Parts List



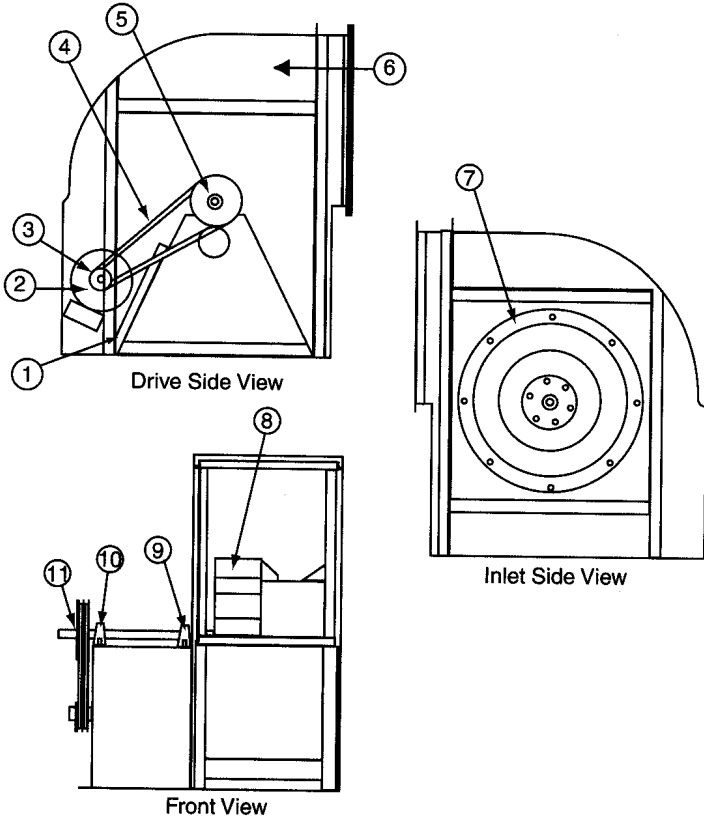
Part No.	Description
<b>Sizes 120 - 730</b>	
1	Motor Slide Base
2	Motor
3	Motor Sheave
4	Belt Set
5	Fan Sheave
6	Housing
7	Isolation Base (optional)
8	Shaft
9	Outboard Bearing
10	Inboard Bearing
11	Wheel
12	Inlet Cone

### CA/CF SWSI Arrangement 3 Parts List



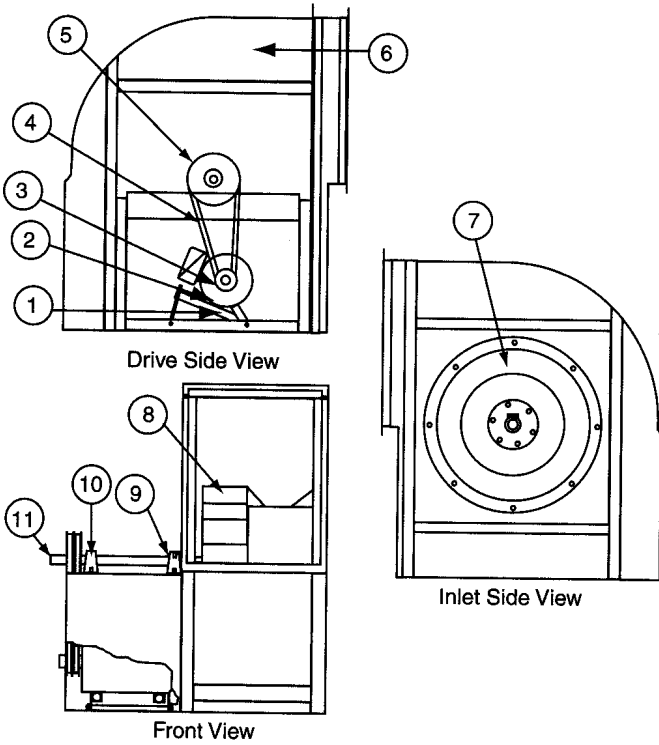
Part No.	Description
<b>Sizes 120 - 730</b>	
1	Motor Slide Base
2	Motor Sheave
3	Motor
4	Belt Set
5	Fan Sheave
6	Housing
7	Drive Side Bearing
8	Drive Side Bearing Support
9	Isolation Base (optional)
10	Shaft
11	Wheel
12	Inlet Cone
13	Free Side Bearing
14	Free Side Bearing Support

### CA/CF SWSI Arrangement 9 Parts List



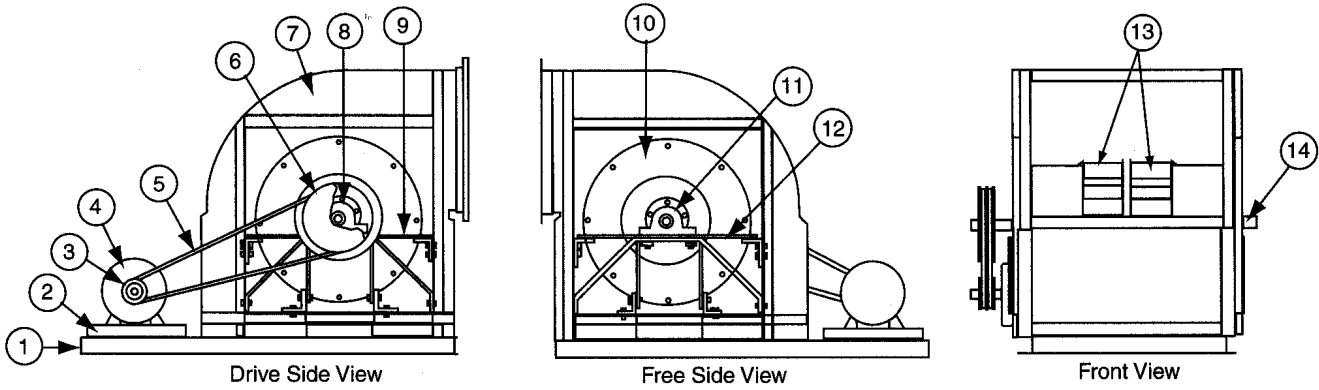
Part No.	Description
	Sizes 120 - 730
1	Motor Slide Base
2	Motor
3	Motor Sheave
4	Belt Set
5	Fan Sheave
6	Housing
7	Inlet Cone
8	Wheel
9	Inboard Bearing
10	Outboard Bearing
11	Shaft

### CA/CF SWSI Arrangement 10 Parts List



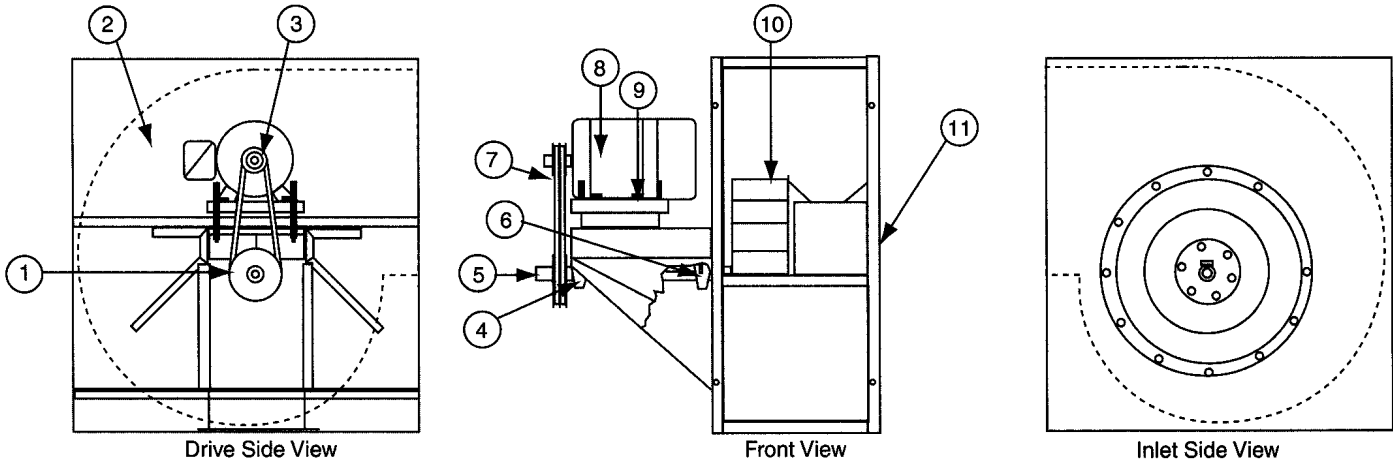
Part No.	Description
	Sizes 120 - 730
1	Motor Base
2	Motor
3	Motor Sheave
4	Belt Set
5	Fan Sheave
6	Housing
7	Inlet Cone
8	Wheel
9	Inboard Bearing
10	Outboard Bearing
11	Shaft

## CA DWDI Parts List



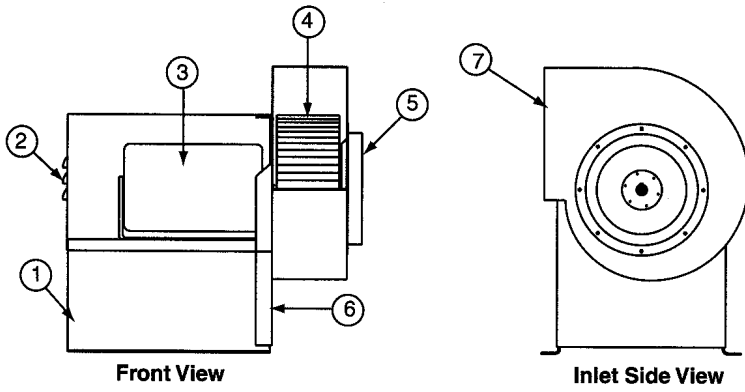
Part No.	Description
<b>Sizes 120 - 730</b>	
1	Isolation Base (optional)
2	Motor Slide Base
3	Motor Sheave
4	Motor
5	Belt Sheave
6	Fan Sheave
7	Housing
8	Drive Side Bearing
9	Drive Side Bearing Support
10	Inlet Cone (2)
11	Free Side Bearing
12	Free Side Bearing Support
13	Wheel Assembly
14	Shaft

## CA-4 SWS/CA-4 DWDI/CF-4 SWSI Parts List



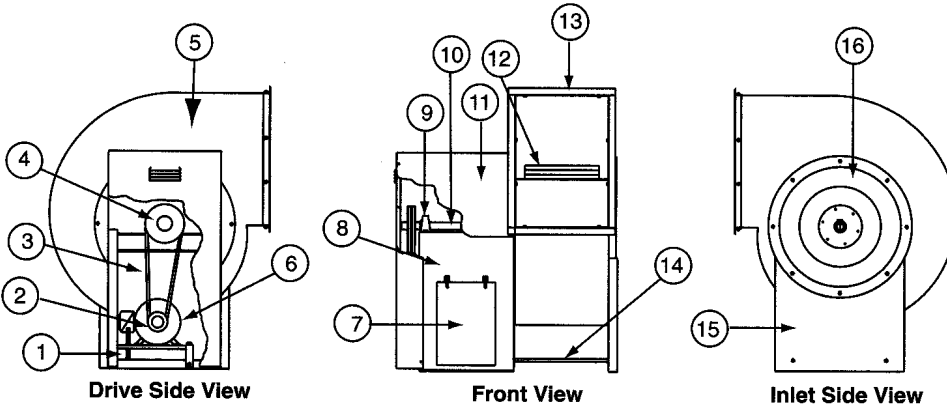
Part No.	Description
<b>Sizes 120 - 600</b>	
1	Fan Sheave
2	Housing
3	Motor Sheave
4	Outboard Bearing
5	Shaft
6	Inboard Bearing
7	Belt Set
8	Motor
9	Motor Base
10	Wheel
11	Inlet

## CPFD Parts List



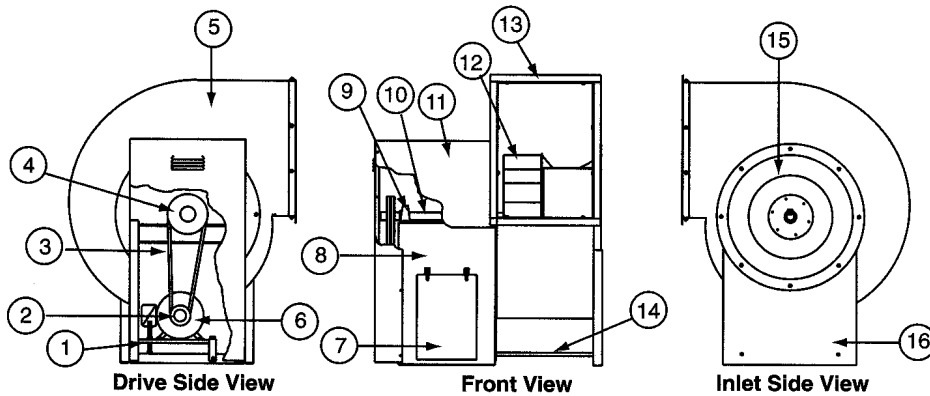
Part No.	Description
	Sizes 6 - 10
1	Motor Base
2	Weather Cover (Optional)
3	Motor
4	Wheel
5	Inlet
6	Blower Mounting Plate
7	Scroll

## CPFB Parts List



Part No.	Description
	Sizes 100 - 300
1	Motor Mount
2	Motor Sheave
3	Belt Set
4	Fan Sheave
5	Housing
6	Motor
7	Optional Side Cover (2)
8	Pedestal
9	Bearings (2)
10	Shaft
11	Optional Weather Cover
12	Wheel Assembly
13	Discharge Flange
14	Spreader Bar (2)
15	Inlet Side Support
16	Inlet Cone

## CPA/CPA-A/CPS/CPS-A/CPV Parts List



Part No.	Description				
	CPA Size 60-490	CPA-A Size 120-490	CPS Size 60-490	CPS-A Size 120-490	CPV Size 60-490
1	Motor Mount	Motor Mount	Motor Mount	Motor Mount	Motor Mount
2	Motor Sheave	Motor Sheave	Motor Sheave	Motor Sheave	Motor Sheave
3	Belt Set	Belt Set	Belt Set	Belt Set	Belt Set
4	Fan Sheave	Fan Sheave	Fan Sheave	Fan Sheave	Fan Sheave
5	Housing	Housing	Housing	Housing	Housing
6	Motor	Motor	Motor	Motor	Motor
7	Optional Side Cover (2)	Optional Side Cover (2)	Optional Side Cover (2)	Optional Side Cover (2)	Optional Side Cover (2)
8	Pedestal	Pedestal	Pedestal	Pedestal	Pedestal
9	Bearings (2)	Bearings (2)	Bearings (2)	Bearings (2)	Bearings (2)
10	Shaft	Shaft	Shaft	Shaft	Shaft
11	Optional Weather Cover	Optional Weather Cover	Optional Weather Cover	Optional Weather Cover	Optional Weather Cover
12	Wheel Assembly	Wheel Assembly	Wheel Assembly	Wheel Assembly	Wheel Assembly
13	Discharge Flange	Discharge Flange	Discharge Flange	Discharge Flange	Discharge Flange
14*	Spreader Bar (2)	Spreader Bar (2)	Spreader Bar (2)	Spreader Bar (2)	Spreader Bar (2)
15	Inlet Cone	Inlet Cone	Inlet Cone	Inlet Cone	Inlet Cone
16*	Inlet Side Support	Inlet Side Support	Inlet Side Support	Inlet Side Support	Inlet Side Support

\*For units adapted to curb/plenums, the removal of spreader bars and inlet side support are required.

**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, mis-used, 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.

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