H-SERIES

Hooded Propeller Roof Fans

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

This publication contains the installation, operation and maintenance instructions for standard units of the *H-Series: Hooded Propeller Roof Fans.*

- HEE/HES
- HEF
- HER
- HXE/HXS
- HXF
- HEE-D/HES-D
- HEF-D
- HER-D

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

Loren Cook catalogs, *H-Series Belt Drive* and *H-Series Direct Drive*, provide 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:

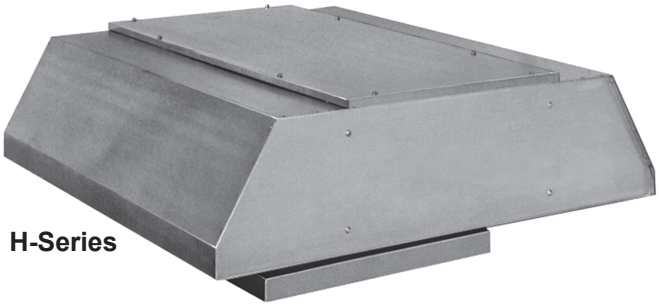
- lorencook.com
- *info@lorencook.com*
- 417-869-6474 ext. 166

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. The control panel, if ordered, is shipped inside of the roof base. It is not counted as a separate part.

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



H-Series

Handling

Lift the fan by the base.

NOTICE! Never lift by the shaft, motor or housing. If your fan has a special protective finish, handle with extreme care.

Even a small chip will break the coating's continuity and destroy its ability to protect the metal.

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

⚠WARNING

Rotating Parts & Electrical Shock Hazard:

Fans should be installed and serviced by qualified personnel only.

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

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

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

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

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

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

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

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

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

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

Storage

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

Outdoor Storage

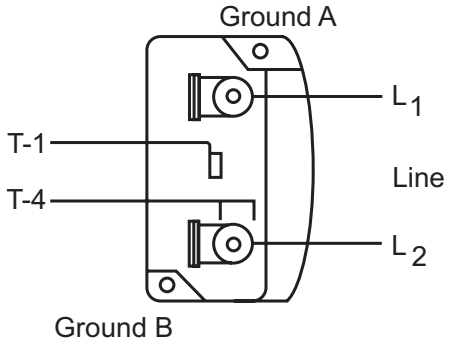
To maintain good working condition of the fan when it is stored outdoors or at a construction site, follow the instructions below.

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

Installation

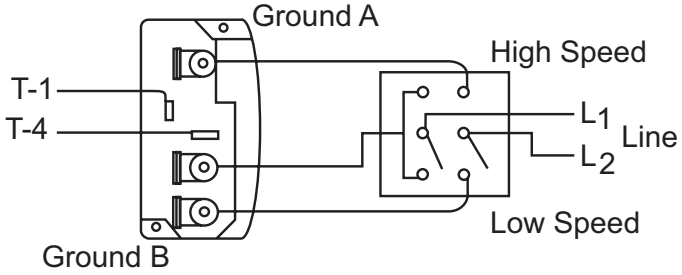
Wiring Diagrams

Single Speed, Single Phase Motor



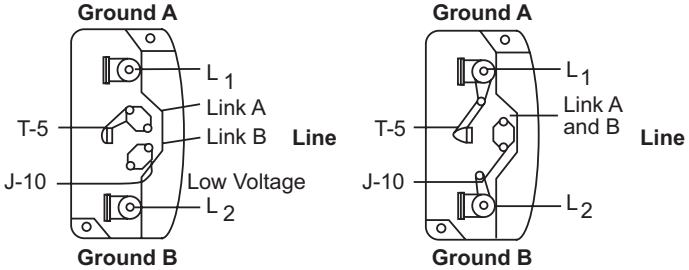
When ground is required, attach to ground A or B with No. 6 thread forming screw. To reverse, interchange T-1 and T-4.

2 Speed, 2 Winding, Single Phase Motor



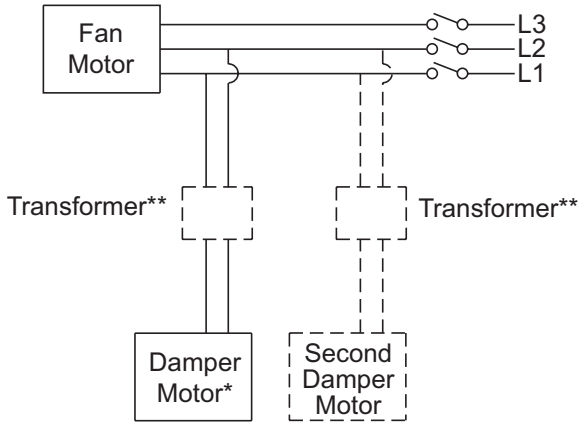
When ground is required, attach to ground A or B with No. 6 thread forming screw. To reverse, interchange T-1 and T-4 leads.

Single Speed, Single Phase, Dual Voltage



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

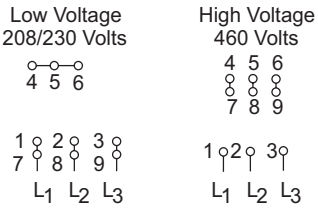
Typical Damper Motor Schematic



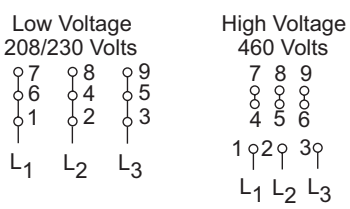
For 3-Phase, damper motor voltage should be the same between L_1 and L_2. For single phase application, disregard L_3. *Damper motors may be available in 115, 230 and 460 volt models. The damper motor nameplate voltage should be verified prior to connection. **A transformer may be provided in some installations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

3 Phase, 9 Lead Motor

Y-Connection

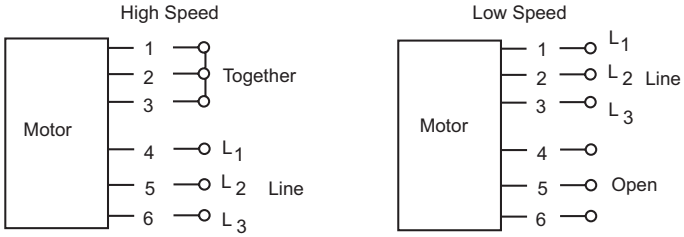


Delta-Connection



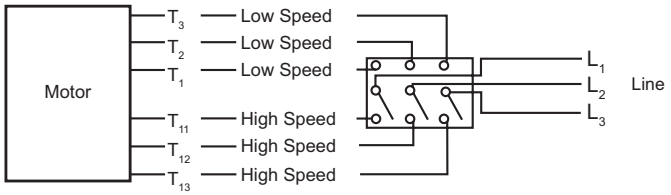
To reverse, interchange any two line leads.

2 Speed, 1 Winding, 3 Phase Motor



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

2 Speed, 2 Winding, 3 Phase



To reverse, High Speed: interchange leads T_{11} and T_{12}; Low Speed: interchange leads T_1 and T_2; Both Speeds: interchange any two line leads.

Damper Installation

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

1. Place the damper inside the curb. Ensure the damper will open freely for the correct direction of the airflow.
2. Secure to curb at the damper shelf.
3. Drill a hole in the curb shelf for conduit needed for motor wiring.
4. Operate the dampers manually to ensure the blades move freely. Dampers should be released from full open position to check for proper closing.

Motor Installation

If your fan is a direct drive (model HEE-D, HES-D, HEF-D or HER-D), proceed to Wiring Installation.

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

The motor should be mounted in order that the motor plate is between the fan shaft and the motor shaft.

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

Belt and Pulley Installation

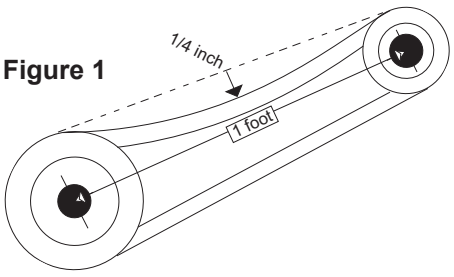
Belt tension is determined by the sound of the belts when the fan is first started. The belts will produce a loud squeal, which dissipates after the fan is operating at full capacity. If belt tension is too tight or too loose, lost efficiency and damage can occur.

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

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

Pulley Alignment

Figure 1



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

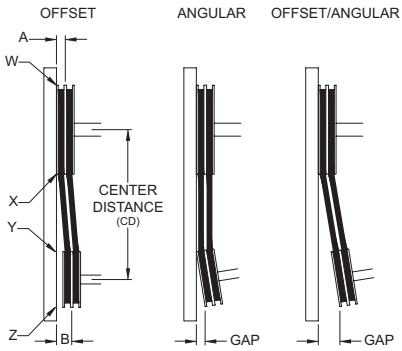


Figure 2

Tolerance

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

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

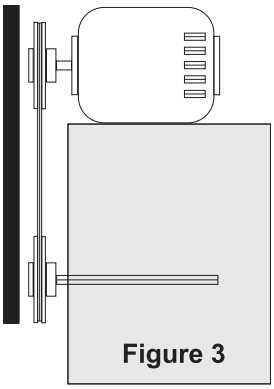


Figure 3

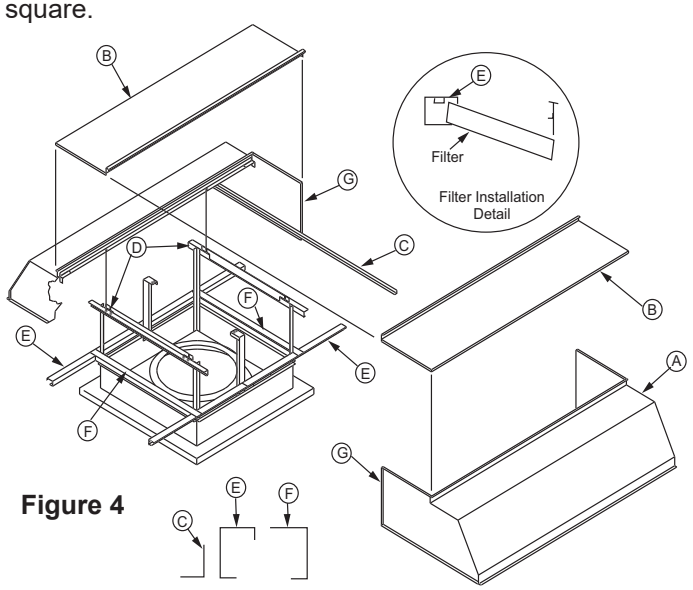


Figure 4

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. Refer to Wiring Diagrams, pages 2 and 3.

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.

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

Fan Installation

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

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

Hood Assembly

Hoods for some non-filtered fans (size 42 and larger) and some filtered fans (size 36 or larger) require field assembly. Assembly is accomplished using 1/2" and 9/16" socket wrenches. Line-up punches and hand clamps will speed up the assembly. *Figure 4* shows the components used to assembly the hood.

1. Place the hood halves (A) onto the hood supports (D). Line up the hood flanges and bolt the flanges of the hood ends (G) together. The top caps (B) must be inter-locked for the flanges to meet correctly.
2. Go under the hood and bolt the hood (angle flange) to the hood supports (D) at the four overlapping locations.
3. Install the two perimeter angles (C), that were shipped loose, inside each end of the hood.
4. If there is a gap between the top cap edges, loosen the top cap bolts. Install a bolt in each end of the top cap flange to pull the two top caps together. Tighten the top cap bolts.

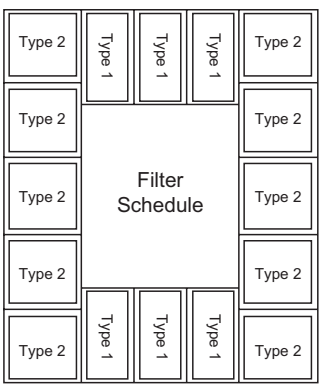
Filtered Fans

1. Place the two long filter retainers (E) (four on size 60) and the two short filter retainers (F) on top of the base and bolt the pieces together.
2. Bolt the long filter retainers (E) to the perimeter angles (C) that are at the ends of each hood.
3. Install filters according to the filter schedule. Refer to Filter Installation detail below. Insert edge of filters into the filter retainer (E), swing filter into position and flip the filter holding clip into position.

H-Series Fan Filter Sizes				
Unit Size	Type 1		Type 2	
	Length x Width	No. Req.	Length x Width	No. Req.
20	14" x 14"	4	14" x 18-7/8"	6
24	18-1/4" x 30-1/8"	2	18-1/4" x 33-1/4"	4
30	20-7/16 x 18-1/16"	4	20-7/16" x 25-13/16"	6
36	22-1/4" x 21-1/16"	4	22-1/4" x 29-5/32"	6
42	24-1/16" x 29-1/2"	4	26-7/8" x 19-1/4"	8
48	27" x 27"	4	27" x 27"	8
54	29-1/8" x 20"	6	29-1/8" x 23-5/8"	10
60	37-11/16" x 21-7/8"	6	26" x 28-5/16"	10

Final Installation Steps

1. Inspect fasteners and setscrews, particularly prop mounting, fan mounting and bearing 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.
4. Test the fan to be sure the rotation is the same as indicated by the arrow marked *Rotation*.



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.

Operation

Pre-Start Checks

1. Lock out all the primary and secondary power sources.
2. Inspect fasteners and setscrews, particularly those used for mounting the prop, mounting the fan, and tighten if necessary.
3. Inspect belt tension and pulley alignment. (Remember, if belt tension is correct, a loud squeal occurs as the fan increases to full power.)
4. Inspect motor wiring.
5. Ensure the belt touches only the pulleys.
6. Rotate the propeller to ensure it does not rub against the venturi.
7. Ensure fan and duct work are clean and free of debris. Test the fan to ensure the rotation of the propeller is the same as indicated by the rotation label (The HER has a reversible propeller and can be operated in either direction).
8. Close and secure all access doors.
9. Restore power to unit.

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	-	-

Start Up

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

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

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 7.

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 following:

30 Minute Interval

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

8 Hour Interval

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

24 Hour Interval

Inspect belt tension. Adjust and tighten as necessary.

Filters

Filter inspection and cleaning intervals can vary from once a week to twice per year depending on contaminant present and acceptable pressure drops across the filter. Under most conditions filters may be cleaned with hot water and a mild soap solution (such as dish washing liquid) or steam. Some caustic cleaners will damage the filter. If in doubt, please consult the factory for a compatibility list.

High pressure spray washers should be limited to 2,000 psi operating pressure. Every attempt should be made to remove the contaminants from the filter in a “back-wash” flow (note airflow arrow on the filter frame). Once the filter is dry, it may be returned to the appropriate filter racks in the same orientation (airflow direction) as they were removed.

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. Clean the propeller and air inlets if material build-up is excessive. Excessive build-up can cause imbalance and failure of the propeller.

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. See *Belt and Pulley Installation*
- 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

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.

Bearings should be relubricated in accordance with the condition chart below.

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 damage the seal and reduce the life through excess contamination and/or loss of lubricant.

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

Conditions Chart		
RPM	**Temp. (°F)**	**Greasing Interval**
Up to 1000	-30 to 120	6 months
	120 to 200	2 months
1000–3000	-30 to 120	3 months
	120 to 200	1 month
Over 3000	-30 to 120	1 month
	120 to 200	2 weeks
Any Speed	< -30	Consult Factory
Any Speed	> 200	1 week

For moist or otherwise contaminated installations, divide the interval by a factor of three. For vertical shaft installations, divide the interval by a factor of two.

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 pre-vent 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	1-1/2 yrs.	3 months	1 yr.	3 months	6 months	1-1/2 months
Severe	6 months	1-1/2 months	6 months	1-1/2 months	3 months	2 weeks

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.

Motor Services

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

Changing Shaft Speed

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

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. Clean the motor and fan shafts.
2. Loosen the motor plate mounting bolts to relieve the belt tension. Remove the belt.
3. Loosen the pulley setscrews and remove the pulleys from the shaft.

If excessive force is required to remove the pulleys, a three-jaw puller can be used. This tool, however, can easily warp a pulley. If the puller is used, inspect the trueness of the pulley after it is removed from the shaft. The pulley will need replacement if it is more than 0.020" out of true.

4. Clean the bores of the pulleys and place a light coat of oil on the bores.
5. Remove grease, rust and burrs from the shaft.
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.

Maximum RPM

HXEL, HXSL, HXFL Size	Max. RPM
20	1276
24	1126
30	932
36	720
42	610
48	516
54	478
60	450

HEXM, HXSM, HXFM Size	Max. RPM
20	1462
24	1400
30	1184
36	864
42	718
48	598
54	522
60	539

HEE Size	Max. RPM
24	1675
30	1295
36	1125
42	880
48	822
54	776
60	636

HES Size	Max. RPM
24	1630
30	1330
36	1165
42	885
48	830
54	742
60	642

HEF Size	Max. RPM
24	1635
30	1330
36	1160
42	880
48	816
54	735
60	634

HER Size	Max. RPM
24	1635
30	1325
36	1145
42	920
48	818
54	748
60	642

7. After the pulleys have been correctly placed back onto their shafts, tighten the pulley setscrews.
8. Install the belts on the pulleys. Align and adjust the belts to the proper tension as described in *Belt and Pulley Installation*, page 3.

Bearing Replacement

The fan bearings are pillow block ball bearings.

1. Remove the top cap or hood as necessary to gain access to the fan.
2. Loosen the motor plate mounting bolts and remove the drive belts.
3. Remove the propeller from the shaft.
4. Remove the four (4) bearing hold-down bolts and then remove the shaft, bearings, and driven sheave from the unit as an assembly.
5. Measure and record the location of the bearings and sheave on the shaft. This will aid the reassembly.
6. Remove the anti-corrosion coating from the shaft with a suitable degreaser and then remove the pulley from the shaft.
7. Remove the bearing from the shaft using a bearing puller.
8. Install the pulley in the correct location on the shaft Secure the bearing hold-down bolts, but do not fully tighten.
9. Align the setscrews on the bearings and tighten one setscrew on each bearing.
10. Rotate the shaft to allow the bearing outer rings to find their center of free movement.
11. Install the propeller on the shaft and adjust the bearing position to center the propeller in the opening.
12. Tighten the hold-down bolts to the proper torque. Refer to *Torque Chart*, page 4.
13. Turn the shaft by hand. Resistance should be the same as it was before the hold-down bolts were fully tightened.
14. Tighten the bearing setscrews to the specified torque.
15. Install the pulley and adjust the belt tension.
16. Reassemble the fan.

After 24 hours of continuous operation, tighten the setscrews to the appropriate torque. This assures the full locking of the inner race to the shaft. Ensure 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 the rounding out of the setscrew socket when applying maximum torque.

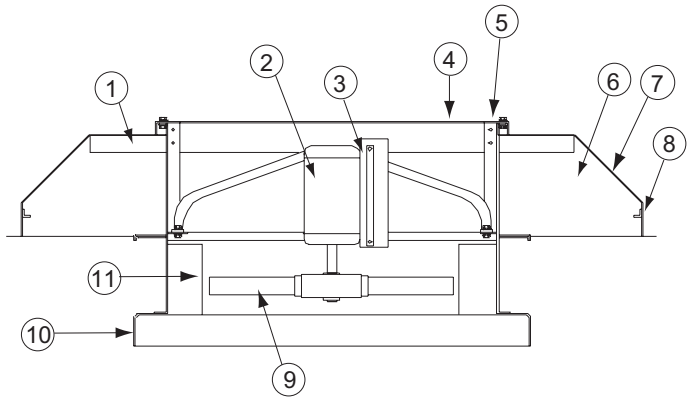
Propeller and Shaft Replacement Precautions

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

Troubleshooting

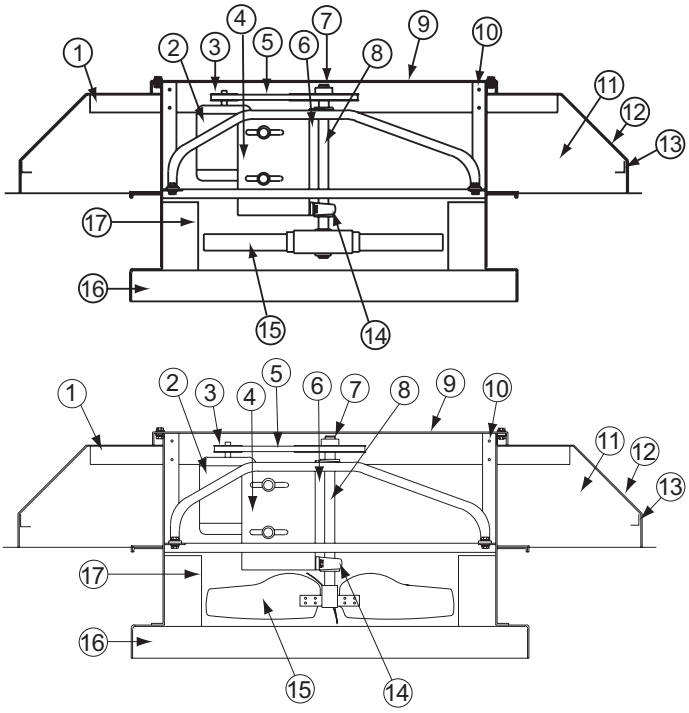
Problem and Potential Cause
Low Capacity or Pressure: • Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly • Poor fan inlet conditions. There should be a straight clear duct at the inlet • Improper wheel alignment
Excessive Vibration 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
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 Bearings: • Improper bearing lubrication • Excessive belt tension

HEE-D/HES-D/HER-D Parts List



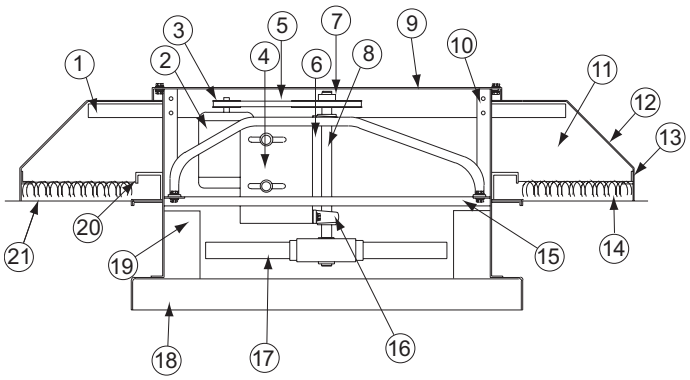
HEE-D/HES-D/HER-D			
Part No.	**20–30**	**36–48**	**54–72**
1	-	-	Hood Support Angle (2)
2	Motor	Motor	Motor
3	Motor Plate	Motor Plate	Motor Plate
4	Topcap	Topcap	Topcap
5	Corner Post (4)	Corner Post (4)	Corner Post (4)
6	Hood End	Hood End	Hood End
7	Hood Side	Hood Side	Hood Side
8	Perimeter Angle (4)	Perimeter Angle (4)	Perimeter Angle (4)
9	Extruded Propeller	Extruded Propeller	Extruded Propeller
10	Base Assembly/ Power Assembly	Base Assembly/ Power Assembly	Base Assembly/ Power Assembly
11	Supply Venturi	Supply Venturi	Supply Venturi

HEE/HES/HER Parts List

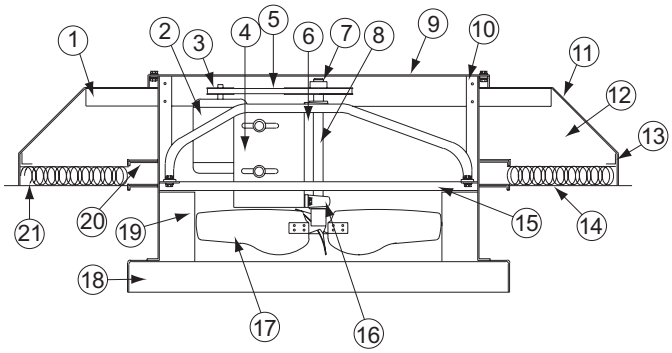


HEF, HES, HEE, HER, HXEL,HXEM, HXSL, HXSM			
Part No.	**20–30**	**36–48**	**54–72**
1	-	-	Hood Support Angle (2)
2	Motor	Motor	Motor
3	Motor Sheave	Motor Sheave	Motor Sheave
4	Motor Plate	Motor Plate	Motor Plate
5	Belts	Belts	Belts
6	-	-	Center Post (2) (*Size 72 or HEF size 60 only*)
7	Fan Sheave	Fan Sheave	Fan Sheave
8	Shaft	Shaft	Shaft
9	Topcap	Topcap	Topcap
10	Corner Post (4)	Corner Post (4)	Corner Post (4)
11	Hood End	Hood End	Hood End
12	Hood Side	Hood Side	Hood Side
13	Perimeter Angle (4)	Perimeter Angle (4)	Perimeter Angle (4)
14	Bearings	Bearings	Bearings
15	HXEM/HXSM/HXEL/HXSL - X-Stream Propeller: HEE/HES/HER - Extruded Propeller		
16	Base Assembly: Power Assembly		
17	Supply Venturi	Supply Venturi	Supply Venturi

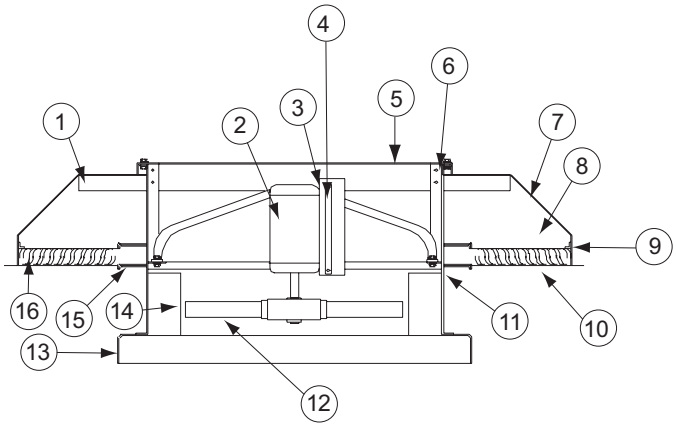
HEF Parts List



HXFL/HXFM Parts List



HEF-D Parts List



HEF, HXFL & HXFM					
Part No.	**24–30**	**36–42**	**48**	**54–60**	**72**
1	-		Hood Support Angle	Hood Support Angle	
2	Motor	Motor		Motor	
3	Motor Sheave	Motor Sheave		Motor Sheave	
4	Motor Plate	Motor Plate		Motor Plate	
5	Belt	Belt		Belt	
6	-	-		-	Center Post
7	Fan Sheave	Fan Sheave		Fan Sheave	
8	Shaft	Shaft		Shaft	
9	Topcap	Topcap		Topcap	
10	-		Corner Post	Corner Post	
11	Hood End	Hood End		Hood End	
12	Hood Side	Hood Side		Hood Side	
13	Perimeter Angle (4)	Perimeter Angle (4)		Perimeter Angle (4)	
14	Filter Rack (2)	Filter Rack (2)		Filter Rack (2)	
15	Power Assembly	Power Assembly		Power Assembly	
16	Bearings	Bearings		Bearings	
17	HEF - Extruded Propeller: HXFL/HXFM - X-Stream Propeller				
18	Base Assembly	Base Assembly		Base Assembly	
19	Supply Venturi	Supply Venturi		Supply Venturi	
20	Filter Crossmember	Filter Crossmember		Filter Crossmember	
21	Filter*	Filter*		Filter*	
* See Filter Schedule on page 4					

HEF-D					
Part No.	**24–30**	**36–42**	**48**	**54–60**	**72**
1	-		Hood Support Angle	Hood Support Angle	
2	Motor	Motor		Motor	
3	Motor Plate	Motor Plate		Motor Plate	
4	-	-		-	Center Post
5	Topcap	Topcap		Topcap	
6	-		Corner Post	Corner Post	
7	Hood End	Hood End		Hood End	
8	Hood Side	Hood Side		Hood Side	
9	Perimeter Angle (4)	Perimeter Angle (4)		Perimeter Angle (4)	
10	Filter Rack (2)	Filter Rack (2)		Filter Rack (2)	
11	Power Assembly	Power Assembly		Power Assembly	
12	Extruded Propeller	Extruded Propeller		Extruded Propeller	
13	Base Assembly	Base Assembly		Base Assembly	
14	Supply Venturi	Supply Venturi		Supply Venturi	
15	Filter Crossmember	Filter Crossmember		Filter Crossmember	
16	Filter*	Filter*		Filter*	
17	* See Filter Schedule on page 4				

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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