



This publication contains the installation, operation and maintenance instructions for standard units of the *Economizer Fan - Economizer Fans with Mix, Recirculate, Supply and Exhaust Modes.*



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

Loren Cook catalog, *Economizer Fan*, 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.

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 for free operation of all moving parts
- Record on the *Delivery Receipt* any visible sign of damage

Handling

Lifting bars are located on the top of the cabinet assembly. They should be used to lift the unit and also to lower the unit on to the curb. The hood assembly should be lifted by the shipping crate or the base.



Economizer

!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.

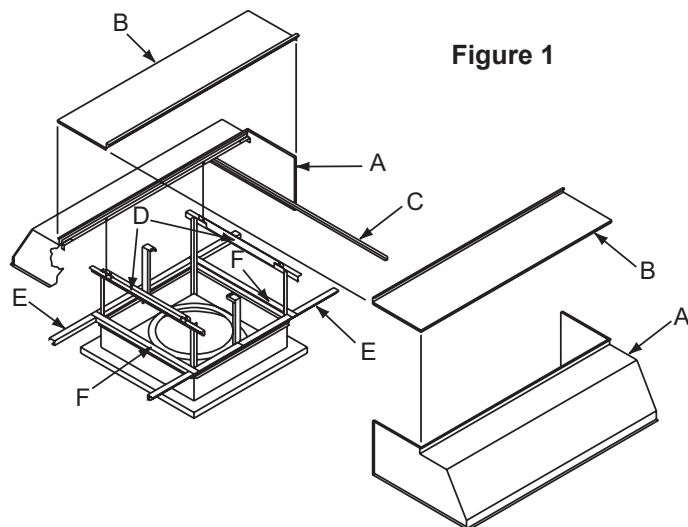
The attachment of roof mounted fans to the roof curb as well as the attachment of roof curbs to the building structure must exceed the structural requirements based on the environmental loading derived from the applicable building code for the site. The local code official may require variations from 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 unit 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.

Installation

1. Ensure there is a minimum 3 inch clearance between the interior of the building and the unit's side dampers.
2. Attach lifting straps to the lifting bars at the top of the cabinet assembly. Lift the assembly and then lower it through the roof curb until the assembly's outer flange rests on the top of the roof curb. The curb should be level to allow the cabinet to hang free.
3. Assemble the hood to hood base. Refer to *Hood Assembly* instructions on page 2.
4. Lower the hood assembly on to the roof curb and secure it and the cabinet assembly to the roof curb with anchor bolts or lag screws as required.
5. Pre-wire the service switch on the roof base, if equipped.
6. Install the hood assembly filters, if required. Refer to *Filtered Units Only* section on page 2.
7. Install the outlet diffuser on the lower end of the cabinet assembly, if equipped. Place the diffuser over the bottom of the cabinet assembly. Secure the diffuser to the cabinet with number 12 sheet metal screws installed through the flange, spaced at 6 inch intervals around the perimeter.
8. If no outlet diffuser is supplied, install the outlet guard over the bottom of the cabinet assembly. Secure the outlet guard to the cabinet with number 12 sheet metal screws installed through the flange, spaced at 6 inch intervals around the perimeter.
9. Install the control panel, if equipped, in a convenient location. Refer to the wiring installation section, page 3 for wiring instructions.



Hood Assembly

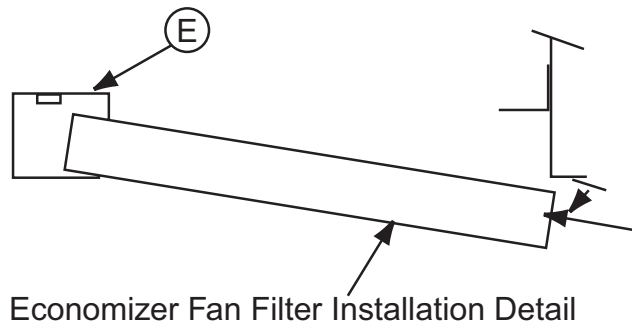
Hoods on some non-filtered units (size 54 or larger) and some filtered units (size 48 or larger) require field assembly. Assembly is accomplished using 1/2 inch and 9/16 inch socket wrenches.

Line-up punches and hand clamps will speed up the assembly. *Figure 1* shows the components used to assemble 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 together. The topcaps (B) must be interlocked 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) 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 Units Only

5. Place the two long filter retainers (E) and the two short filter retainers (F) on top of the base and bolt the pieces together.
6. Bolt the long filter retainers (E) to the perimeter angles (C) that are at the ends of each hood.
7. Install filters according to the Filter Schedule. Insert the edge of the filter into the filter retainer (E), swing filter into position and flip the filter holding the clip into position. Refer to the Filter Installation detail illustration.



Control Panel Installation (if equipped)

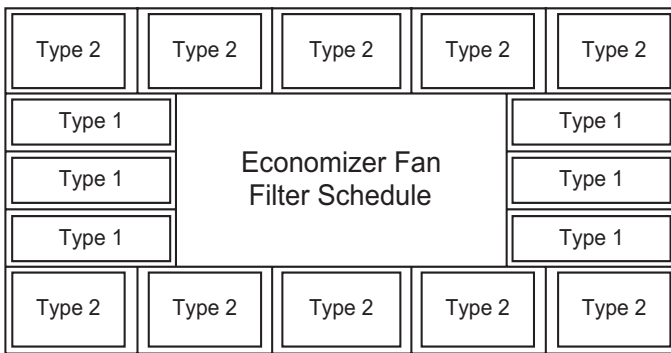
The optional control panel is used to control the functions of the Economizer fan. Locate the panel in a convenient area to install wiring and operate the fan. Permanently attach the control panel to a suitable structure by bolting through the back of the panel.

Temperature Sensor Installation (if equipped)

A temperature sensor is supplied as a part of the optional Modulating Temperature Control. To prevent damage to the fan during transit, the temperature sensor is shipped loose (inside the control panel). Follow the instructions below to mount the temperature sensor.

1. Drill a 11/32 inch diameter hole in one corner of the venturi panel, located in the bottom of the fan cabinet.
2. From the inside of the cabinet, screw the compression fitting (shipped with the sensor) into the hole.
3. Install the sensor through the hole (push through 1/2").
4. Tighten the fitting to hold the sensor in place.

(Filter Schedule on next page)



Follow the wiring diagram in the disconnect switch and the wiring diagram provided with the motor.

Wiring Installation

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

Fan accessories will determine the wiring installation procedure you should follow. If your unit has a disconnect

switch, follow the wiring diagram provided on the disconnect switch and the wiring diagram on 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).

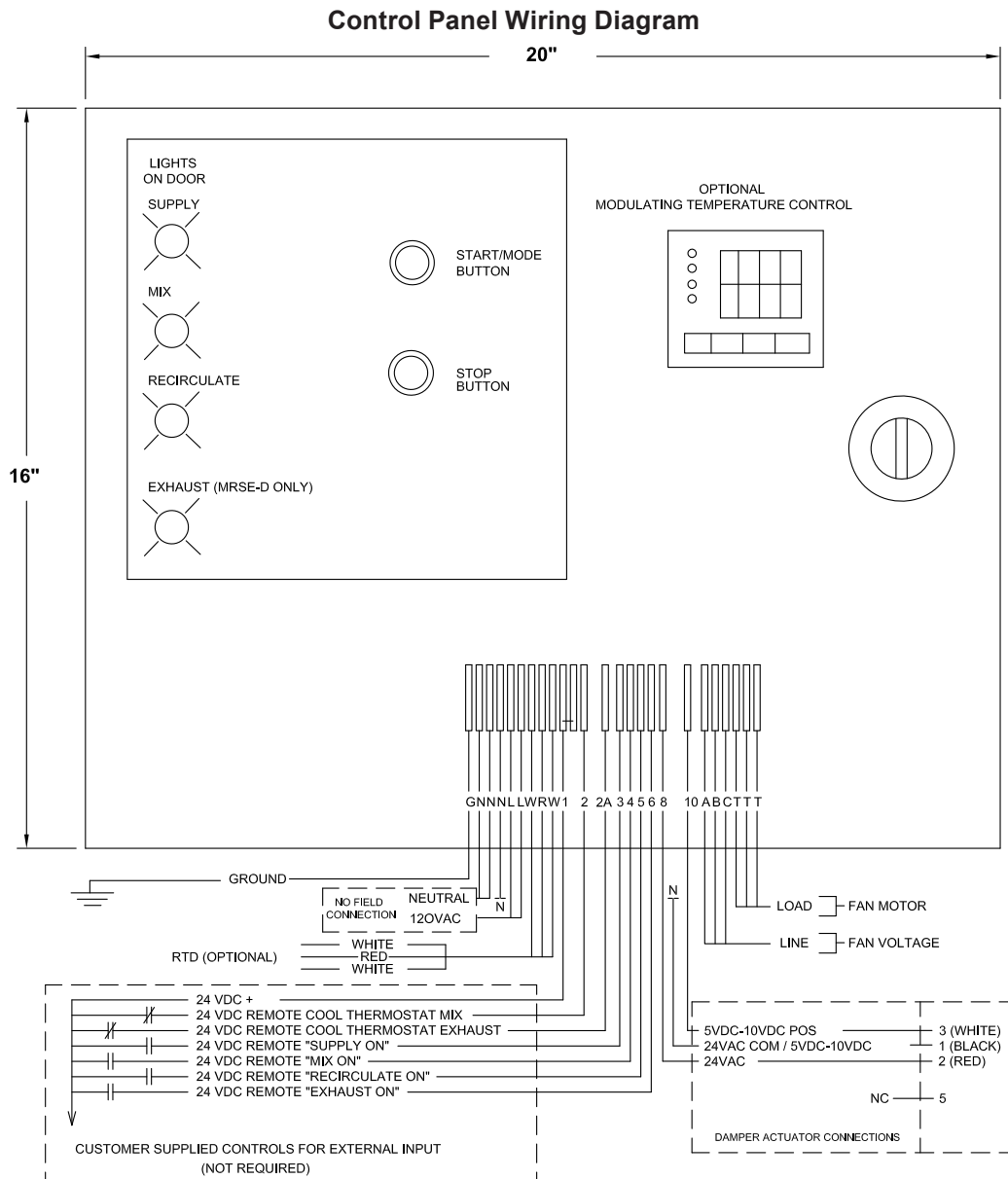


Lock off all power sources before unit is wired to power source. Restrain the wire as necessary to pre-vent it from being pulled into any rotating parts.

Fan Wiring

Drill a wire access hole through the cabinet side below one of the access doors. Attach the appropriate size wire and conduit to the motor and run the wires to the control panel. Attach wires (18 gauge minimum) to the damper actuator (Red, Black, #3) and the temperature sensor (Red, 2-White), if equipped, and run the wires to the control panel. Attach the fan wires to the control panel terminals according to the diagram below.

Wire the roof disconnect switch, if equipped, and the fan motor. The fan should rotate clockwise, when looking up from the bottom, in supply mode. The rotation may be changed by switching two of the three motor leads. When rotation is correct, reinstall the access panels.



Final Installation Steps

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

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	-	-

Operation

Pre-Start Checks

1. Lock out all the primary and secondary power sources.
2. Check and tighten fasteners and setscrews, particularly those used for mounting the unit.
3. Check motor wiring.
4. Rotate the prop to ensure it does not rub against the venturi.
5. Ensure fan and duct work are clean and free of debris.
6. Close and secure all access doors.
7. Restore power to unit.

There are four basic designs for the operation control panel on this unit. They are defined by whether or not the fan unit is reversible, and whether or not the mix mode is supplied with a temperature control and modulating dampers.

Modes

MRS-D: mix, recirculate, supply.

MRS-D with Modulating Temperature Controller:

mix dependent upon fan outlet temperature, recirculate, supply.

MRSE-D: mix, recirculate, supply, exhaust.

MRSE-D with Modulating Temperature Controller:

mix dependent upon fan outlet temperature, recirculate, supply, exhaust.

The function pad on the front of the control panel contains two operators - a **Start/Mode** button and a **Stop** button.

When the Start/Mode button is depressed, the top mode light will start to flash. This light will flash for three seconds to indicate that a mode is ready to begin. If the mode button is pressed again within the three second delay, the next mode light will begin to flash. If the mode light is allowed to flash for the full three seconds, the light will then stay on and the fan will start.

If the panel contains a temperature controller, this module will be powered only during mix mode. The display on the temperature controller indicates the outlet temperature of the fan and the set value which it is trying to produce by mixing outside air and inside air. The set value temperature must be between the indoor and outdoor temperatures in order for the fan to match the set value. Refer to the Control Panel for programming instructions to set the value temperature.

If the operating mode is changed, such that the direction of the propeller rotation must change, there will be a 30 second spin down delay before the start of the new mode.

Start-Up

Turn fan on in supply mode. Inspect for the following:

- Direction of rotation.
 - Excessive vibration.
 - Unusual noise.
 - 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 trouble. Refer to Troubleshooting, page 5.***

Inspection

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

30 Minute Interval

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

8 Hour Interval

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

24 Hour Interval

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

Maintenance

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

Inspect fans exhausting corrosive air within the first month of operation.

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

It is recommended that inspection of the unit be conducted twice annually.

- Inspect bolts and setscrews for tightness. Tighten as necessary. Refer to *Recommended Torque* chart
- Inspect for cleanliness. Clean exterior surfaces only. Removing dust and grease build-up on motor housing assures proper motor cooling

Clean the propeller and air inlets if material build-up is excessive. Excessive build-up can cause imbalance and failure of the propeller. When cleaning the propeller, always clean the entire propeller. Partial cleaning will cause imbalance and will lead to unit failure.

Filters

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

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

Please note the following tables concerning filter sizes.

Economizer Fan Filter Sizes				
Unit Size	Type 1		Type 2	
	Length x Width	No. Req.	Length x Width	No. Req.
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"	6
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	37-7/8" x 21-7/8"	6	26" x 28-9/16"	10

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 air-stream consisting of airborne abrasives.

Motor Services

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

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 propeller 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

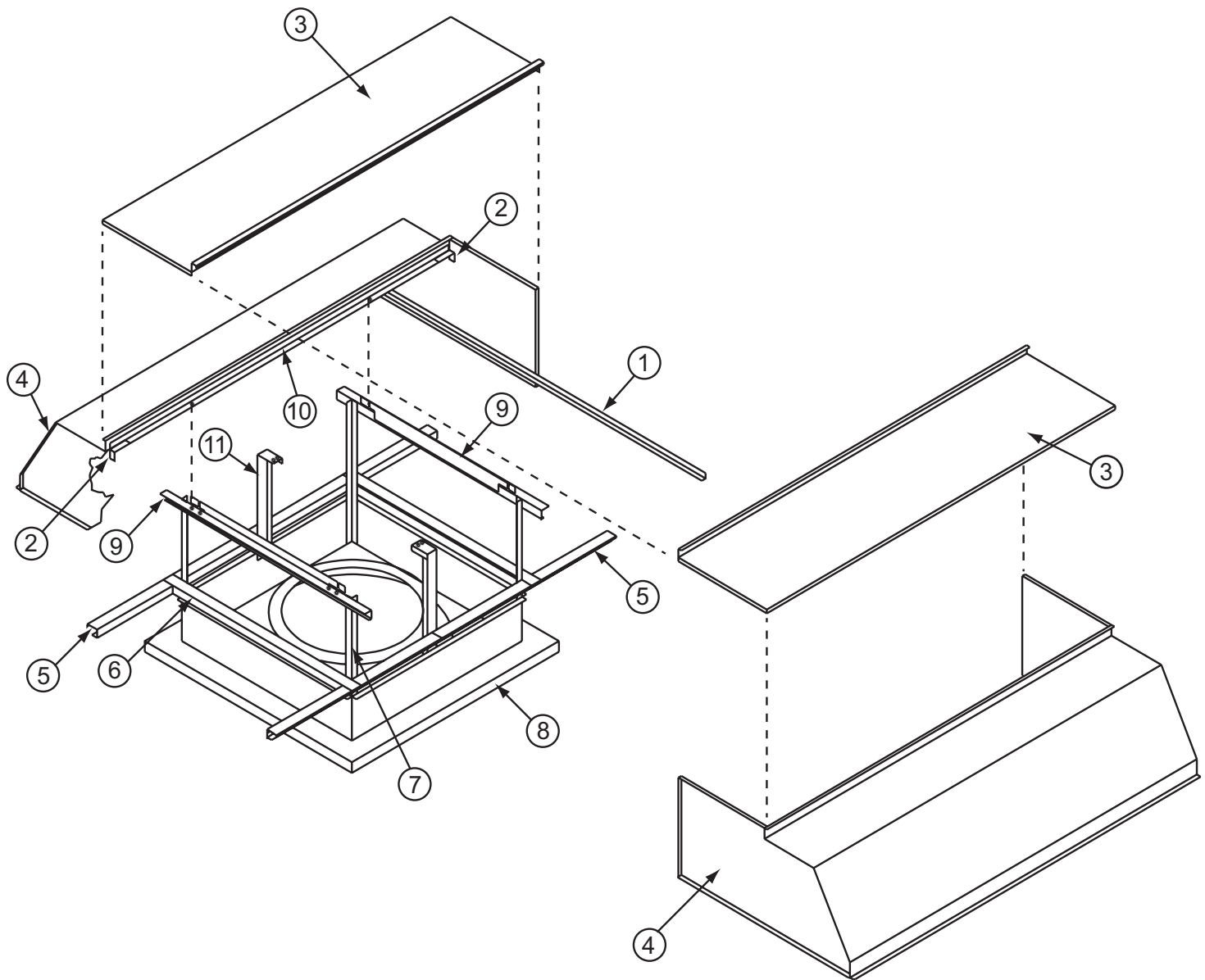
Overheated Motor:

- 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:

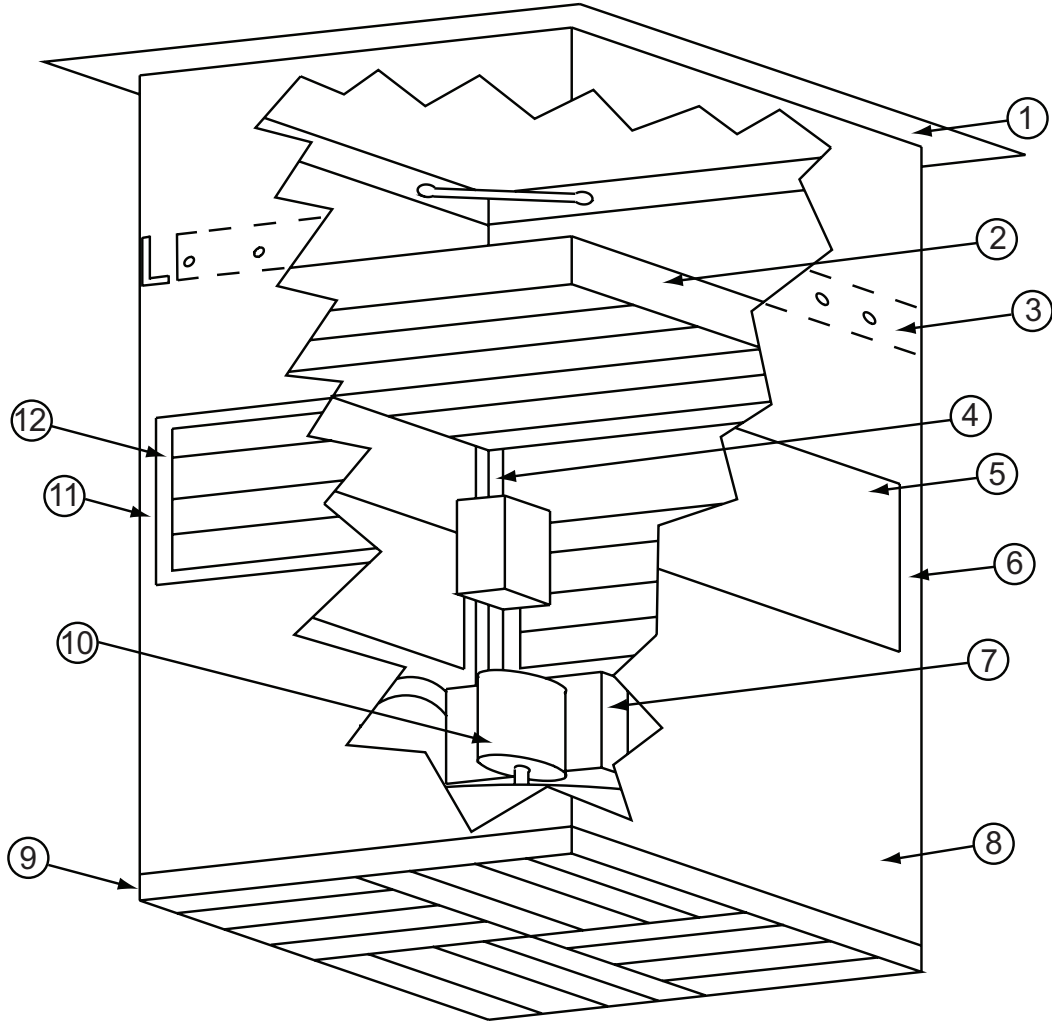
- Improper bearing lubrication
- Excessive belt tension

Economizer Hood Replacement Parts List



Part No.	Description	Number Required													
		Non-Filtered							Filtered						
		24	30	36	42	48	54	60	24	30	36	42	48	54	60
1	Perimeter Angle	-	-	-	-	4	4	4	4	4	4	4	4	4	8
2	Angle Support	-	-	-	-	4	4	4	-	-	-	4	4	4	4
3	Top Cap	1	1	2	2	2	2	2	1	2	2	2	2	2	2
4	Hood	1	1	1	1	2	2	2	1	1	1	2	2	2	2
5	Filter Rack	-	-	-	-	-	-	-	2	2	2	2	2	2	4
6	Filter Crossmember	-	-	-	-	-	-	-	2	2	2	2	2	2	2
7	Corner Post	4	4	4	4	4	4	4	-	-	-	4	4	4	4
8	Base Assembly	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	Hood Support	-	-	-	-	-	2	2	-	-	-	-	2	2	2
10	Hood Support Angle	-	-	-	-	2	2	2	-	-	-	2	2	2	4
11	Center Post	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not Shown	Filters (MRSF only)	--	--	--	--	--	--	--	6	10	10	10	12	16	16
	Filter Retainer Clips (MRSF only)	--	--	--	--	--	--	--	12	20	20	20	24	32	32

Economizer Cabinet Parts List



Part No.	Description
1	Upper Cabinet Assembly
2	Top Damper
3	Top Damper Support (4)
4	Corner Posts (4)
5	Access Door (2)
6	Access Door Mount (4)
7	Motor Plate
8	Lower Cabinet/ Power Assembly
9	Diffuser Panel (optional)
10	Motor
11	Side Damper Mount (4)
12	Side Damper (2)
Not Shown	Extruded Propeller (not shown)

Limited Warranty

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



LOREN COOK COMPANY

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