



# COOK

# Economizer Fan

Economizer Fans

## INSTALLATION, OPERATION AND MAINTENANCE MANUAL

This publication contains the installation, operation and maintenance procedures for standard units of the *Economizer Fan-Economizer Fans with Mix, Recirculate, Supply and Exhaust Modes*. Carefully read this publication prior to installation.

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 Loren Cook Company Literature Department by phoning 417/869-6474, extension 166; by FAX at 417/832-9431; or by e-mail at info@lorencook.com.

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 assembly.

### 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.

#### 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.

### Installation

- Ensure there is a minimum 3 inch clearance between the interior of the building and the unit's side dampers.
- 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.

- Assemble the hood to hood base. Refer to *Hood Assembly* instructions on page 2.
- 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.
- Pre-wire the service switch on the roof base, if equipped.
- Install the hood assembly filters, if required. Refer to *Filtered Units Only* section on page 2.
- 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.

continued

#### 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.



Economizer

- h. 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.
- i. Install the control panel, if equipped, in a convenient location. Refer to the wiring installation section, page 3 for wiring instructions.

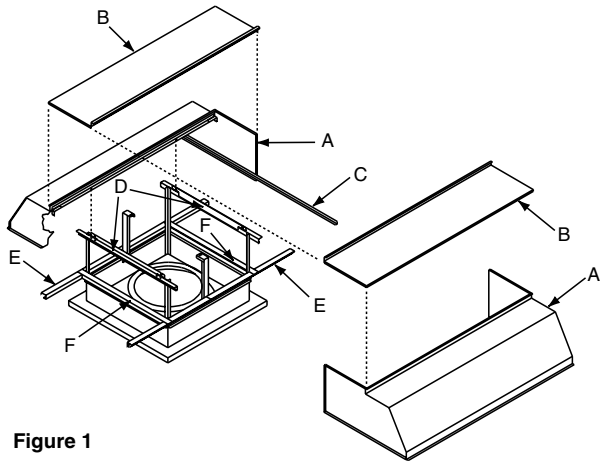


Figure 1

### Hood Assembly

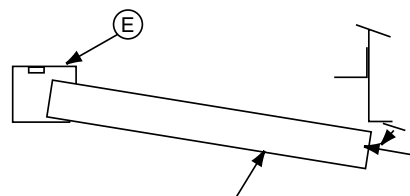
Hoods on some non-filtered units (size 54 or larger) and some filtered units (size 48 or larger) require field assembly. Assembly is accomplished using 1/2 inch and 9/16 inch socket wrenches. Line-up punches and hand clamps will speed up the assembly. Figure 1 shows the components used to assemble the hood.

- a. 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.
- b. Go under the hood and bolt the hood (angle flange) to the hood supports (D) at the four overlapping locations.
- c. Install the two perimeter angles (C) inside each end of the hood.
- d. 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

- e. Place the two long filter retainers (E) and the two short filter retainers (F) on top of the base and bolt the pieces together.
- f. Bolt the long filter retainers (E) to the perimeter angles (C) that are at the ends of each hood.
- g. 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.



Economizer Fan Filter Installation Detail

### 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.

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

Type 2	Type 2	Type 2	Type 2	Type 2
Type 1	Economizer Fan Filter Schedule			Type 1
Type 1				Type 1
Type 1				Type 1
Type 2	Type 2	Type 2	Type 2	Type 2

**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.**

## 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 name-plate. Refer to the *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 prevent it from being pulled into any rotating parts.**

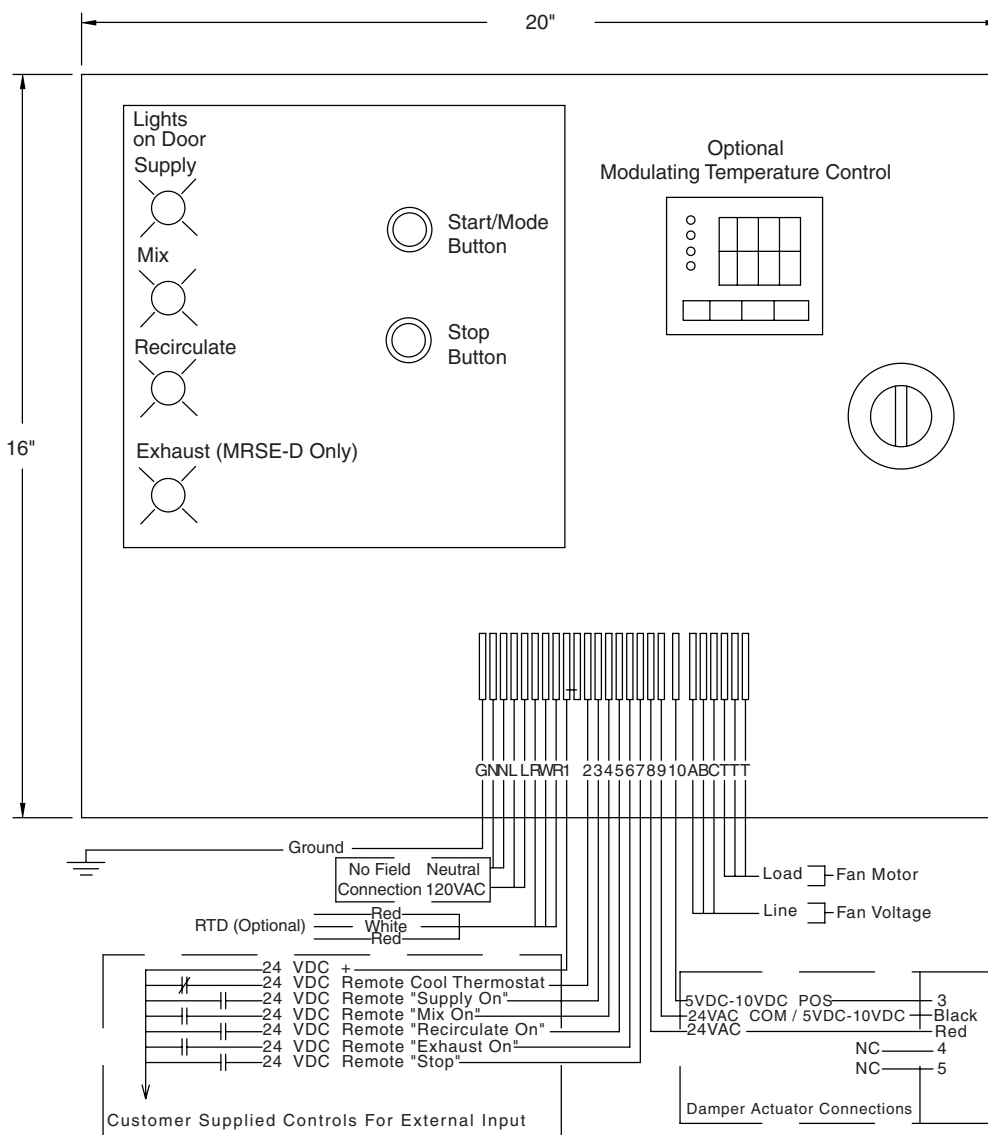
## Fan Wiring

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-Black), if equipped, and run the wires to the control panel. Attach the fan wires to the control panel terminals according to the diagram below.

A terminal (1) is available for use with remote stop controls. Closing a relay between terminals 1 and 5 will do the same function as pushing the stop button on the front of the panel.

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.

## Control Panel Wiring Diagram



## Final Installation Steps

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

### Recommended Torque for Setscrews/Bolts

Setscrews				Hold Down Bolts	
Size	Key Hex Across Flats	Recommended Torque		Size	Wrench Torque
		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

## Operation

### Pre-Start Checks

- Lock out all the primary and secondary power sources.
- Check and tighten fasteners and setscrews, particularly those used for mounting the unit.
- Check motor wiring.
- Rotate the prop to ensure it does not rub against the venturi.
- Ensure fan and ductwork are clean and free of debris.
- Close and secure all access doors.
- 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 3 seconds to indicate that a mode is ready to begin. If the mode button is pressed again within the 3 second delay, the next mode

light will begin to flash. If the mode light is allowed to flash for the full 3 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 the 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 *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'd	Length x Width	No. Req'd
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 19-3/8"	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.

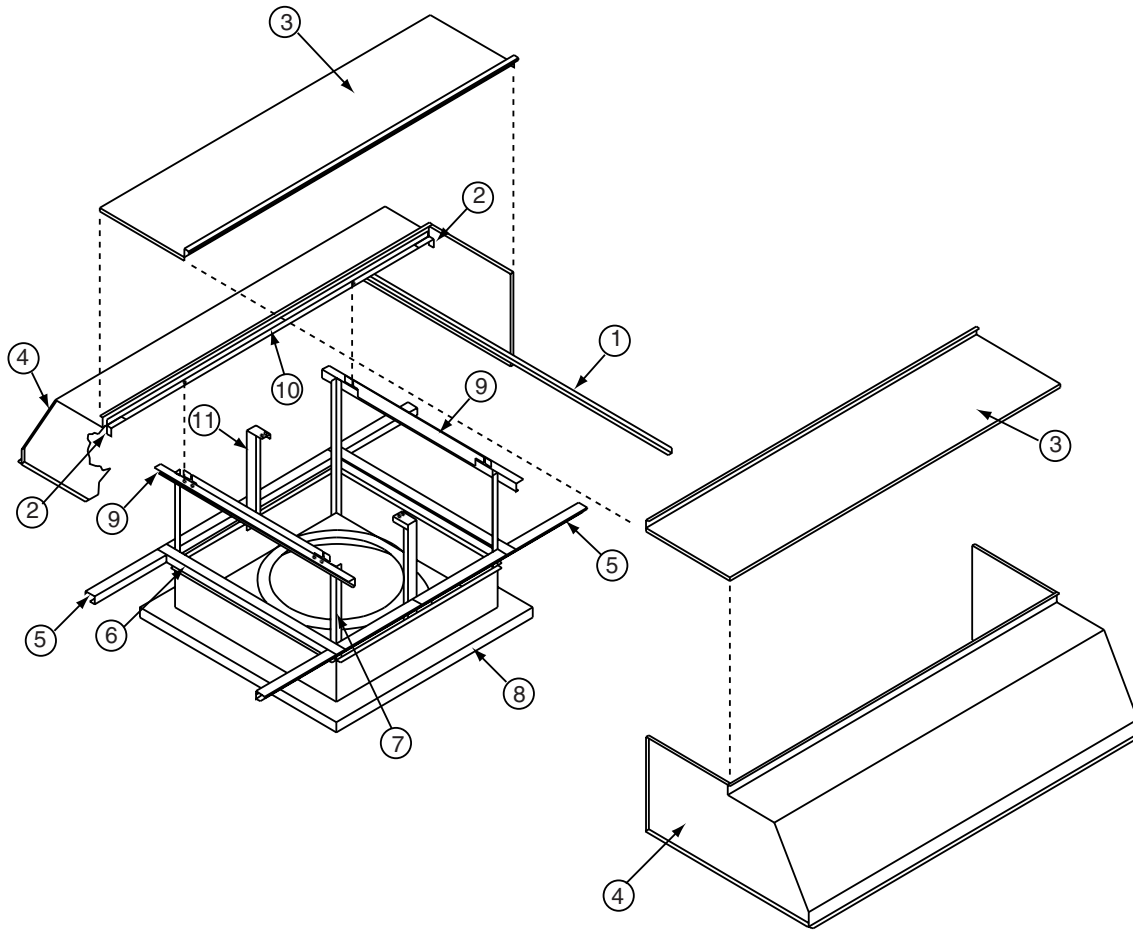
### Motor Services

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

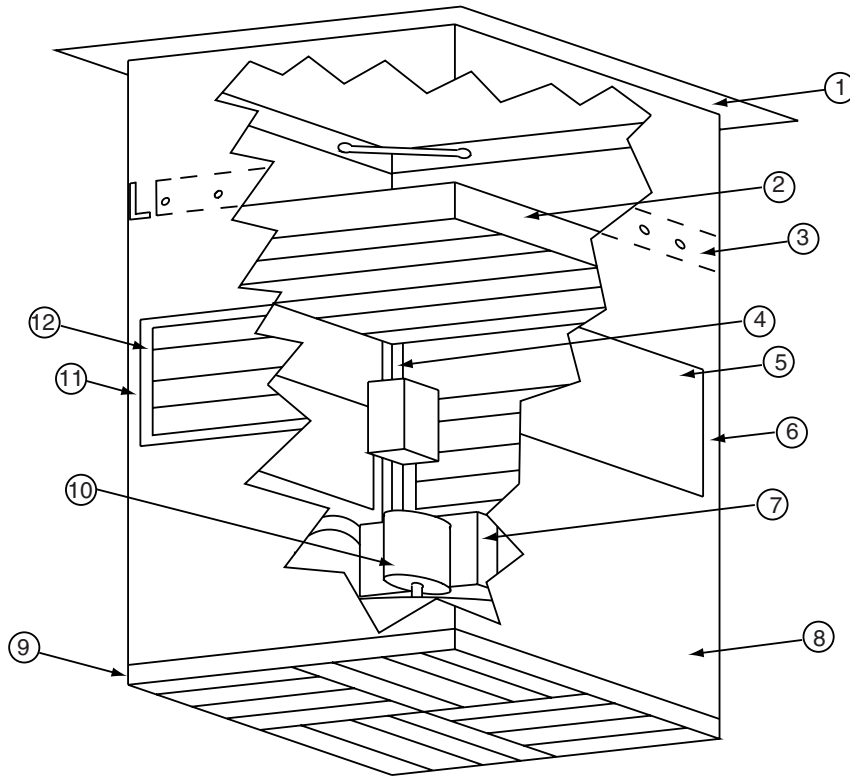
Problem and Potential Cause
<p><b>Low Capacity or Pressure</b></p> <ul style="list-style-type: none"> <li>•Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly.</li> <li>•Poor fan inlet conditions. There should be a straight clear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

# 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	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	-	-	-	-	-	-	-	-	-	-	-	-	-	2		
<b>Parts Not Illustrated</b>																	
	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)
13	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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