Western Water Constructors, Inc.
license no. 188068

Submittal Cover

Job no. 16-05

CONTRACT NAME:	Manteca WQCF Digester Improvements	**SUB #:**	247
SPEC SECTION:	15830 Fans	**REV #:**	0
SUBMITTAL TITLE:	Fans – O&M	**CODE:**	15830-04
FILE NAME:	247-R0_15830-04_Fans-OM	**DATE:**	12/20/2017

WWC REVIEW/COMMENTS: ☒ **NO EXCEPTIONS** ☐ **EXCEPTIONS / DEVIATIONS AS NOTED**

REVIEWED BY: ST **SIGNED:**

WWC HAS REVIEWED THIS SUBMITTAL FOR CONFORMANCE WITH THE PROJECT PLANS & SPECIFICATIONS.

OWNER REVIEW:

ITEM	DESCRIPTION	REVIEW STATUS				
		A	B	C	D	E
1	Fans O&M	☐	☐	☐	☐	☐
2		☐	☐	☐	☐	☐
3		☐	☐	☐	☐	☐
4		☐	☐	☐	☐	☐
5		☐	☐	☐	☐	☐

LEGEND: **A =** No Exceptions Taken **B =** Make Correction Noted **C =** Correct & Resubmit
D = Rejected **E** = Accepted for Record

OWNER COMMENTS:

REVIEWER'S NAME: _____

REVIEWER'S SIGNATURE: _____ **DATE:** _____

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MANTECA WWQF-DIGESTER IMPROVEMENTS PROJECT

SECTION 15830 FANS

DIG-FAN-07-511, DIG-FAN-07-516, DIG-FAN-07-521,
DIG-FAN-07-526, DIG-FAN-07-531, DIG-FAN-07-536

GENERAL CONTRACTOR

WESTERN WATER CONSTRUCTORS
707 AVIATION BLVD.
SANTA ROSA, CA 95403
707-540-9640 FAX 707-540-9641

HVAC CONTRACTOR

JAMES LONG CONSTRUCTION SERVICES, INC
8560 YOUNGER CREEK DR.
SACRAMENTO, CA 95828
916-379-9524

ENGINEER

HERWIT ENGINEERING
6200 CENTER ST, SUITE 310
CLAYTON, CA 94517
925-672-6599

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TAB 1

EQUIPMENT SUMMARY FORMS

EQUIPMENT SUMMARY FORM

1. EQUIPMENT ITEM ECONIMIZER FANS

2. MANUFACTURER COOK

3. EQUIPMENT IDENTIFICATION NUMBER(S) TAG: DIG-FAN-511 MODEL: 30MRSE624D11
(maps equipment number)

4. LOCATION OF EQUIPMENT ROOFTOP DIGESTER CONTROL

5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) 876

6. NAMEPLATE DATA - Horsepower 1.5 HP
Amperage
Voltage 430/3/60
Service Factor (S.F.)
Speed 1140 RPM
ENC Type ODP
Capacity 6400 CFM
Other

7. MANUFACTURER'S LOCAL REPRESENTATIVE

Name CA SYSTEMS

Address PO BOX 5405, EL DORADO HILLS, CA 95762

Telephone
Number 916-802-5049

8. MAINTENANCE REQUIREMENTS PERIODICALLY INSPECT ROTATION PARTS, INSPECT FAN HOUSING FOR CORROSION, BI-ANNUALLY INSPECT BOLTS AND SET SCREW FOR TIGHTNESS, CLEAN DIRTDUCT BUILD UP FROM HOUSING, CLEAN REUSABLE FILTER WHEN BUILD-UP IS VISABLE

9. LUBRICANT LIST MOTOR BEARING ARE PRELUBRICATED FOR TEN YEARS

10. SPARE PARTS (recommendations)

REUSABLE ALUMINUM FIILTER- QTY. 4 @ 20 7/8" X 18 1/16" AND QTY. 6 @ 20 7/16" X 25 13/16"

11. COMMENTS

EQUIPMENT SUMMARY FORM

1. EQUIPMENT ITEM ECONIMIZER FANS

2. MANUFACTURER COOK

3. EQUIPMENT IDENTIFICATION NUMBER(S) TAG: DIG-FAN-516 MODEL: 30MRSE624D11
(maps equipment number)

4. LOCATION OF EQUIPMENT ROOFTOP DIGESTER CONTROL

5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) 876

6. NAMEPLATE DATA - Horsepower 1.5 HP
   Amperage
   Voltage 430/3/60
   Service Factor (S.F.)
   Speed 1140 RPM
   ENC Type ODP
   Capacity 6400 CFM
   Other

7. MANUFACTURER'S LOCAL REPRESENTATIVE

   Name CA SYSTEMS

   Address PO BOX 5405, EL DORADO HILLS, CA 95762

   Telephone
   Number 916-802-5049

8. MAINTENANCE REQUIREMENTS PERIODICALLY INSPECT ROTATION PARTS, INSPECT FAN HOUSING FOR CORROSION, BI-ANNUALLY INSPECT BOLTS AND SET SCREW FOR TIGHTNESS, CLEAN DIRTDUCT BUILD UP FROM HOUSING, CLEAN REUSABLE FILTER WHEN BUILD-UP IS VISABLE

9. LUBRICANT LIST MOTOR BEARING ARE PRELUBRICATED FOR TEN YEARS

10. SPARE PARTS (recommendations)

    REUSABLE ALUMINUM FIILTER- QTY. 4 @ 20 7/8" X 18 1/16" AND QTY. 6 @ 20 7/16" X 25 13/16"

11. COMMENTS

EQUIPMENT SUMMARY FORM

1. EQUIPMENT ITEM ECONIMIZER FANS

2. MANUFACTURER COOK

3. EQUIPMENT IDENTIFICATION NUMBER(S) TAG: DIG-FAN-521 MODEL: 30MRSE624D11
(maps equipment number)

4. LOCATION OF EQUIPMENT ROOFTOP DIGESTER CONTROL

5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) 876

6. NAMEPLATE DATA - Horsepower 1.5 HP
   Amperage
   Voltage 430/3/60
   Service Factor (S.F.)
   Speed 1140 RPM
   ENC Type ODP
   Capacity 6400 CFM
   Other

7. MANUFACTURER'S LOCAL REPRESENTATIVE

   Name CA SYSTEMS

   Address PO BOX 5405, EL DORADO HILLS, CA 95762

   Telephone
   Number 916-802-5049

8. MAINTENANCE REQUIREMENTS PERIODICALLY INSPECT ROTATION PARTS, INSPECT FAN HOUSING FOR CORROSION, BI-ANNUALLY INSPECT BOLTS AND SET SCREW FOR TIGHTNESS, CLEAN DIRTDUCT BUILD UP FROM HOUSING, CLEAN REUSABLE FILTER WHEN BUILD-UP IS VISABLE

9. LUBRICANT LIST MOTOR BEARING ARE PRELUBRICATED FOR TEN YEARS

10. SPARE PARTS (recommendations)

    REUSABLE ALUMINUM FIILTER- QTY. 4 @ 20 7/8" X 18 1/16" AND QTY. 6 @ 20 7/16" X 25 13/16"

11. COMMENTS

EQUIPMENT SUMMARY FORM

1. EQUIPMENT ITEM ECONIMIZER FANS

2. MANUFACTURER COOK

3. EQUIPMENT IDENTIFICATION NUMBER(S) TAG: DIG-FAN-526 MODEL: 30MRSE624D11
(maps equipment number)

4. LOCATION OF EQUIPMENT ROOFTOP DIGESTER CONTROL

5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) 876

6. NAMEPLATE DATA - Horsepower 1.5 HP
   Amperage
   Voltage 430/3/60
   Service Factor (S.F.)
   Speed 1140 RPM
   ENC Type ODP
   Capacity 6400 CFM
   Other

7. MANUFACTURER'S LOCAL REPRESENTATIVE

   Name CA SYSTEMS

   Address PO BOX 5405, EL DORADO HILLS, CA 95762

   Telephone
   Number 916-802-5049

8. MAINTENANCE REQUIREMENTS PERIODICALLY INSPECT ROTATION PARTS, INSPECT FAN HOUSING FOR CORROSION, BI-ANNUALLY INSPECT BOLTS AND SET SCREW FOR TIGHTNESS, CLEAN DIRTDUCT BUILD UP FROM HOUSING, CLEAN REUSABLE FILTER WHEN BUILD-UP IS VISABLE

9. LUBRICANT LIST MOTOR BEARING ARE PRELUBRICATED FOR TEN YEARS

10. SPARE PARTS (recommendations)

    REUSABLE ALUMINUM FIILTER- QTY. 4 @ 20 7/8" X 18 1/16" AND QTY. 6 @ 20 7/16" X 25 13/16"

11. COMMENTS

EQUIPMENT SUMMARY FORM

1. EQUIPMENT ITEM ECONIMIZER FANS

2. MANUFACTURER COOK

3. EQUIPMENT IDENTIFICATION NUMBER(S) TAG: DIG-FAN-531 MODEL: 30MRSE624D11
(maps equipment number)

4. LOCATION OF EQUIPMENT ROOFTOP DIGESTER CONTROL

5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) 876

6. NAMEPLATE DATA - Horsepower 1.5 HP
   Amperage
   Voltage 430/3/60
   Service Factor (S.F.)
   Speed 1140 RPM
   ENC Type ODP
   Capacity 6400 CFM
   Other

7. MANUFACTURER'S LOCAL REPRESENTATIVE

   Name CA SYSTEMS

   Address PO BOX 5405, EL DORADO HILLS, CA 95762

   Telephone
   Number 916-802-5049

8. MAINTENANCE REQUIREMENTS PERIODICALLY INSPECT ROTATION PARTS, INSPECT FAN HOUSING FOR CORROSION, BI-ANNUALLY INSPECT BOLTS AND SET SCREW FOR TIGHTNESS, CLEAN DIRTDUCT BUILD UP FROM HOUSING, CLEAN REUSABLE FILTER WHEN BUILD-UP IS VISABLE

9. LUBRICANT LIST MOTOR BEARING ARE PRELUBRICATED FOR TEN YEARS

10. SPARE PARTS (recommendations)

    REUSABLE ALUMINUM FIILTER- QTY. 4 @ 20 7/8" X 18 1/16" AND QTY. 6 @ 20 7/16" X 25 13/16"

11. COMMENTS

EQUIPMENT SUMMARY FORM

1. EQUIPMENT ITEM ECONIMIZER FANS

2. MANUFACTURER COOK

3. EQUIPMENT IDENTIFICATION NUMBER(S) TAG: DIG-FAN-536 MODEL: 30MRSE624D11
(maps equipment number)

4. LOCATION OF EQUIPMENT ROOFTOP DIGESTER CONTROL

5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) 876

6. NAMEPLATE DATA - Horsepower 1.5 HP
   Amperage
   Voltage 430/3/60
   Service Factor (S.F.)
   Speed 1140 RPM
   ENC Type ODP
   Capacity 6400 CFM
   Other

7. MANUFACTURER'S LOCAL REPRESENTATIVE

   Name CA SYSTEMS

   Address PO BOX 5405, EL DORADO HILLS, CA 95762

   Telephone
   Number 916-802-5049

8. MAINTENANCE REQUIREMENTS PERIODICALLY INSPECT ROTATION PARTS, INSPECT FAN HOUSING FOR CORROSION, BI-ANNUALLY INSPECT BOLTS AND SET SCREW FOR TIGHTNESS, CLEAN DIRTDUCT BUILD UP FROM HOUSING, CLEAN REUSABLE FILTER WHEN BUILD-UP IS VISABLE

9. LUBRICANT LIST MOTOR BEARING ARE PRELUBRICATED FOR TEN YEARS

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11. COMMENTS

TAB 2

GENERAL INFORMATION

ECONOMIZER FAN

Economizer Fans

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

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 bot-tom 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.

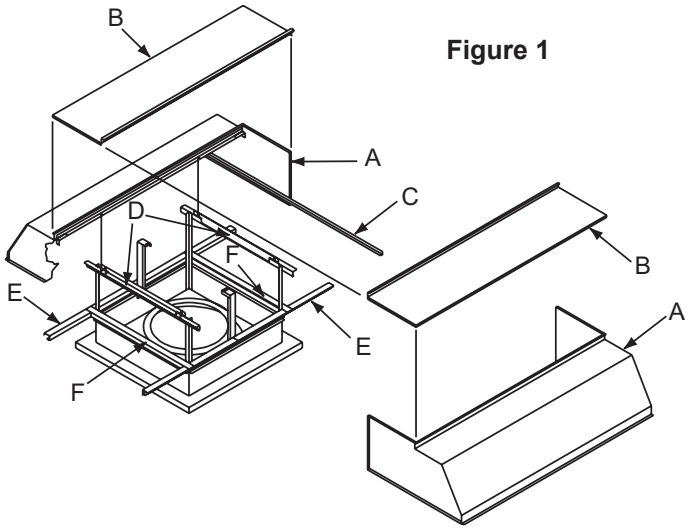


Figure 1

Hood Assembly

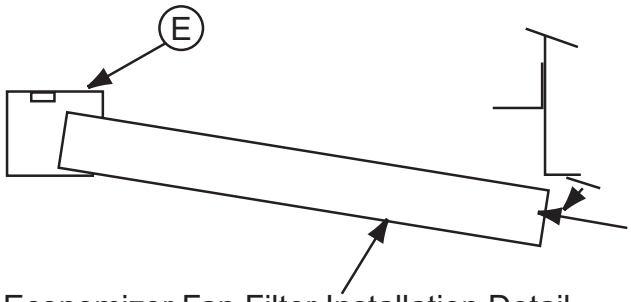
Hoods on some non-filtered units (size 54 or larger) and some filtered units (size 48 or larger) require field assembly. Assembly is accomplished using 1/2 inch and 9/16 inch socket wrenches.

Line-up punches and hand clamps will speed up the assembly. *Figure 1* shows the components used to assemble the hood.

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.



Economizer Fan Filter Installation Detail

Control Panel Installation (if equipped)

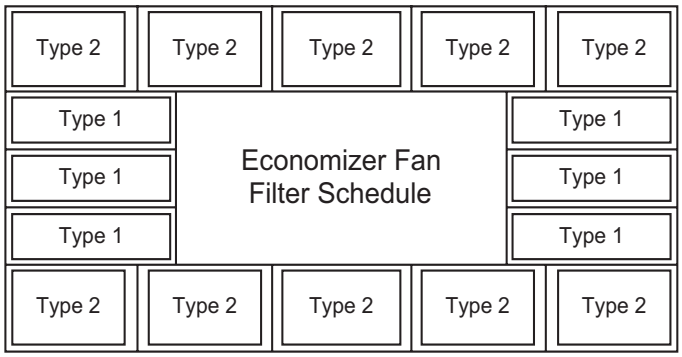
The optional control panel is used to control the functions of the Economizer fan. Locate the panel in a convenient area to install wiring and operate the fan. Permanently attach the control panel to a suitable structure by bolting through the back of the panel.

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.

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).

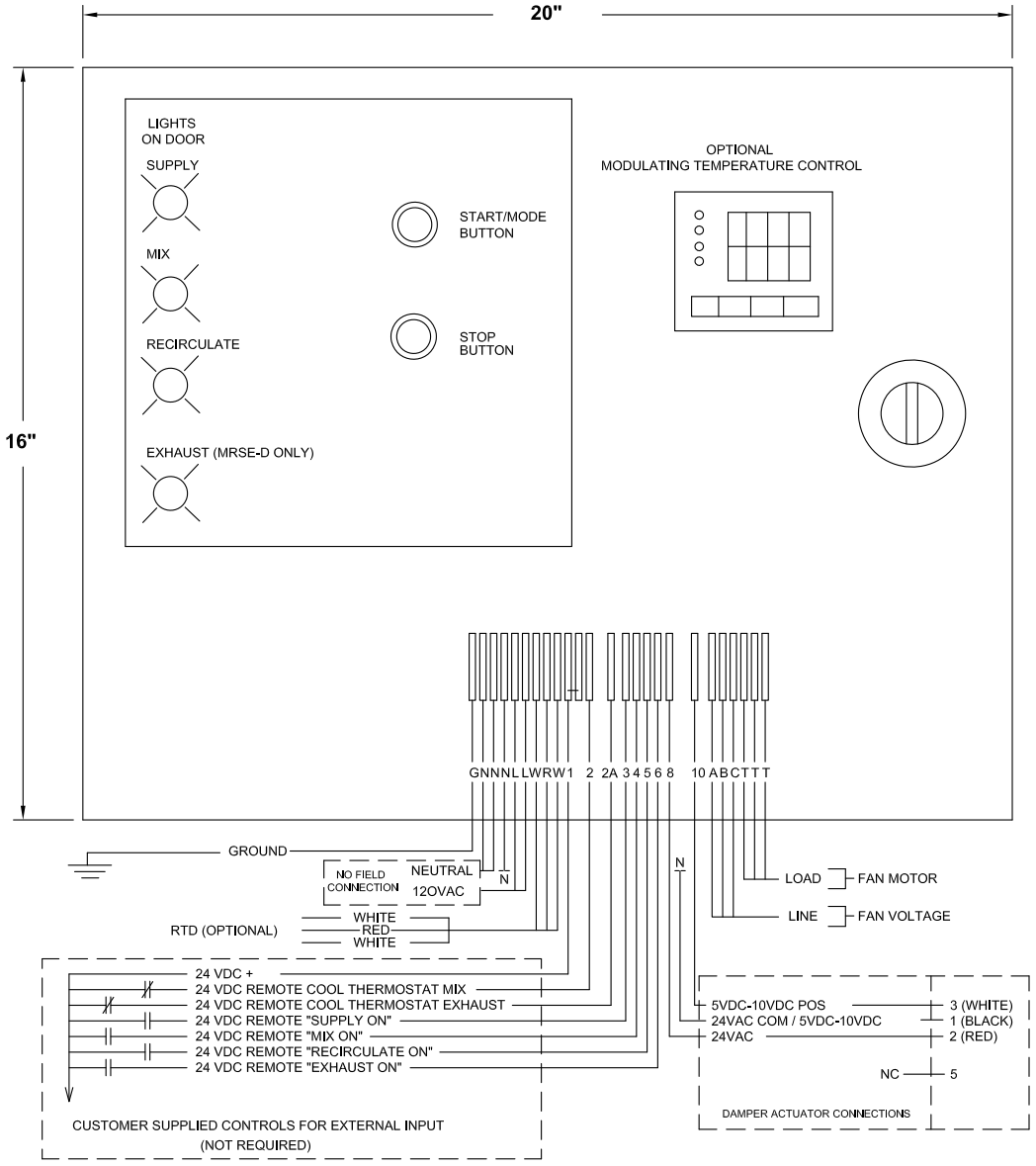
Lock off all power sources before unit is wired to power source. Restrain the wire as necessary to pre-vent it from being pulled into any rotating parts.

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 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.

Control Panel Wiring Diagram



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 airstream consisting of airborne abrasives.

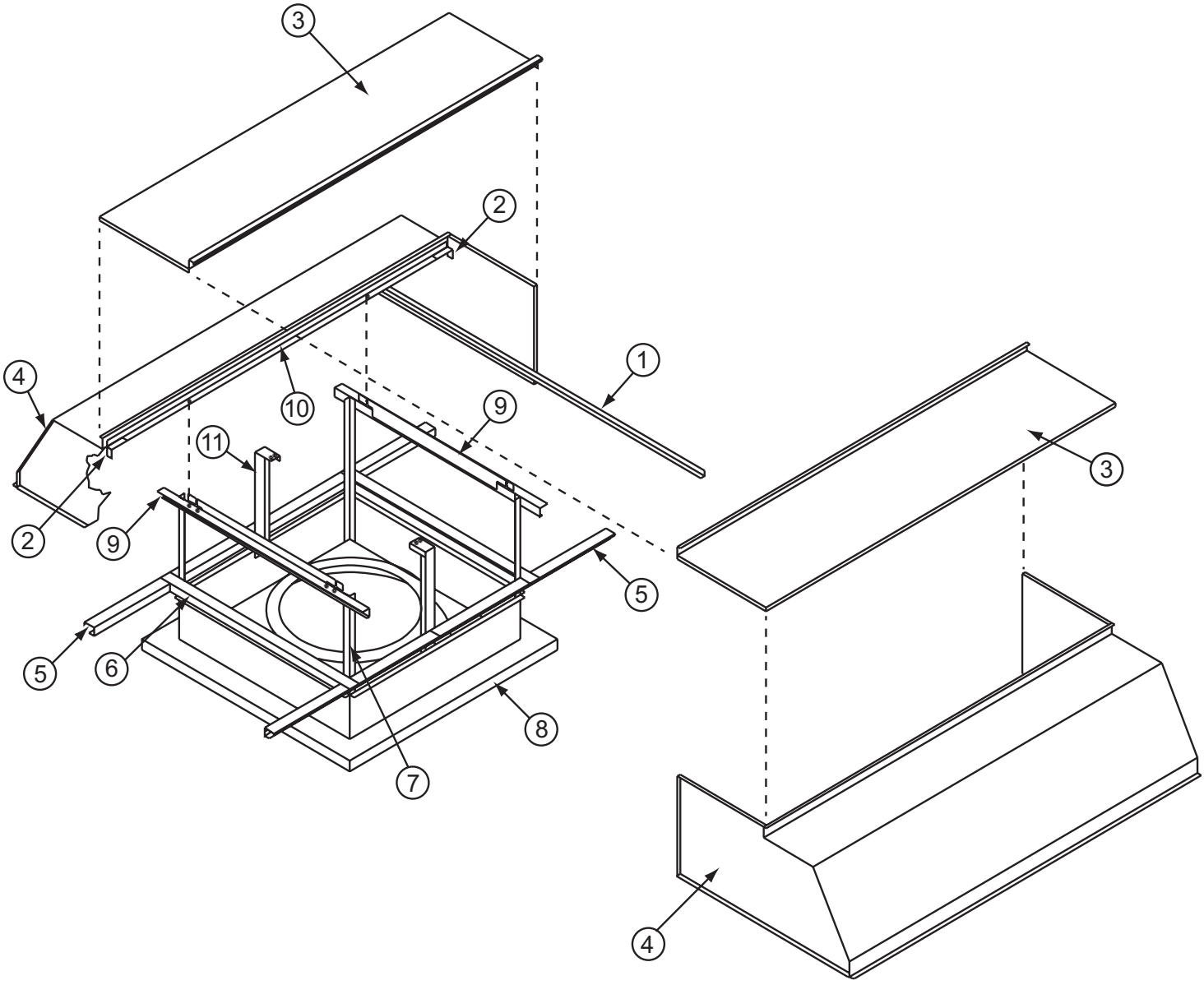
Motor Services

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

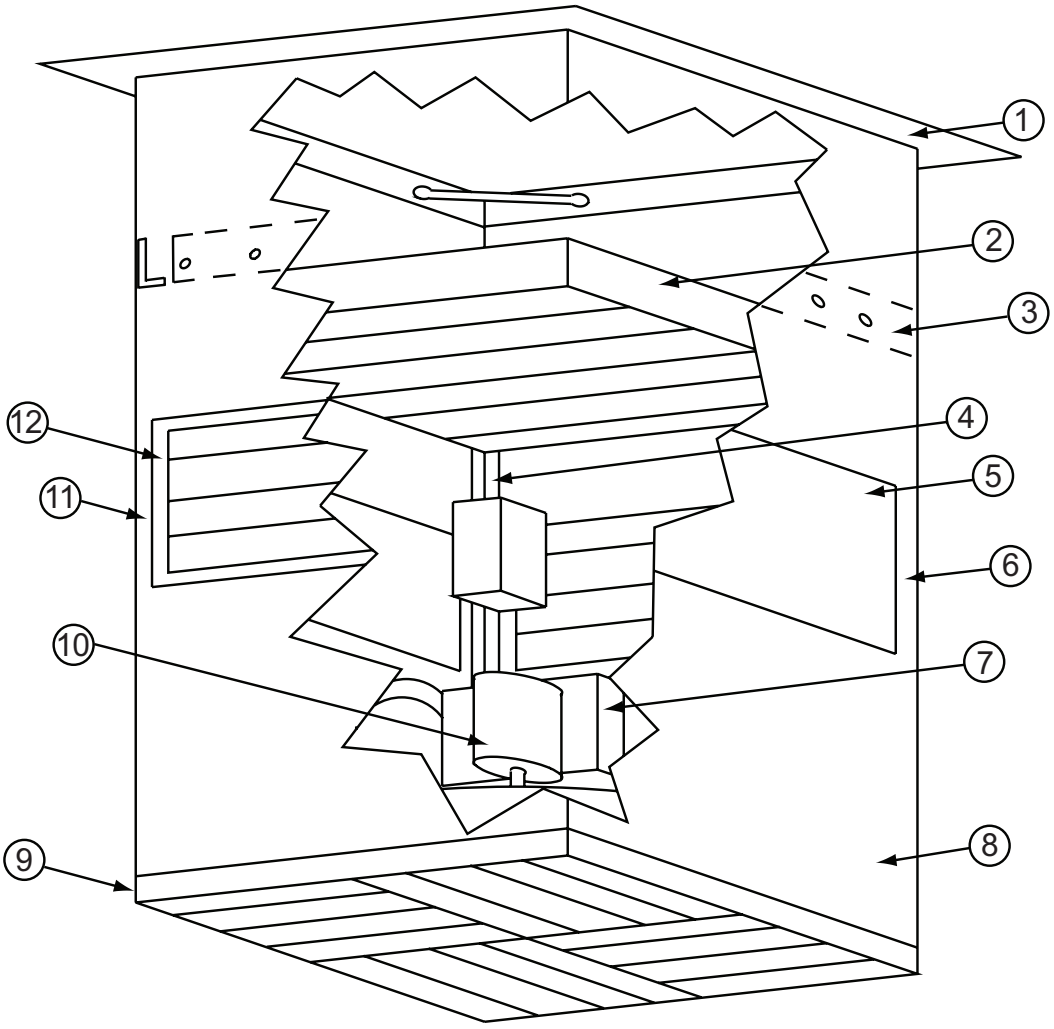
Problem and Potential Cause
Low Capacity or Pressure: • Incorrect direction of rotation. Make sure the fan rotates in same direction as the arrows on the motor or belt drive assembly • Poor fan inlet conditions. There should be a straight clear duct at the inlet • Improper propeller alignment
Excessive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

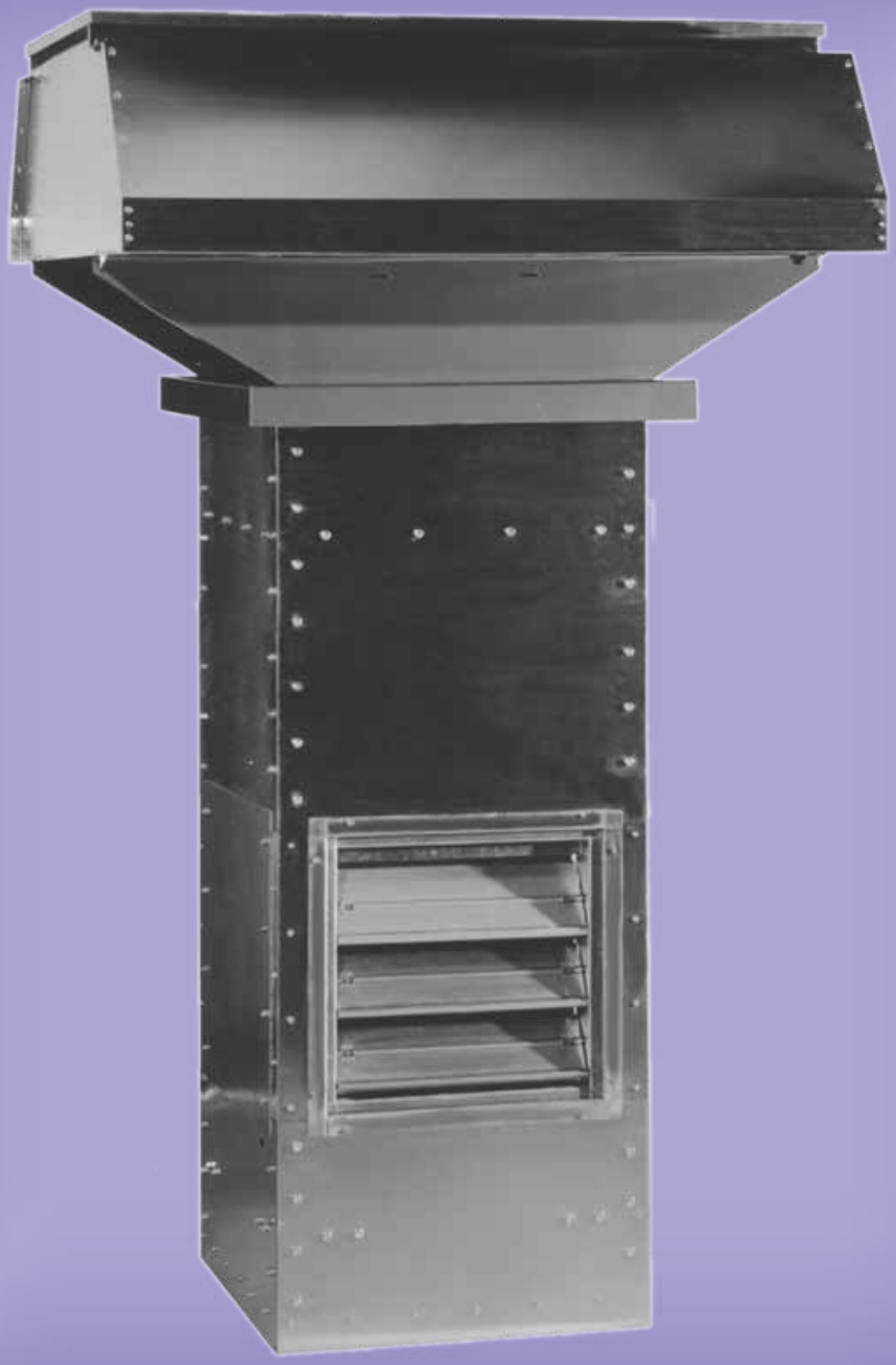
Limited Warranty

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

Corporate Offices: 2015 E. Dale St. Springfield, MO 65803
Phone 417-869-6474 | Fax 417-862-3820 | lorencook.com

Economizer Fan



COOK®

Economizer Fan

Hooded Propeller Fans with Mix, Recirculate, Supply and Exhaust Modes

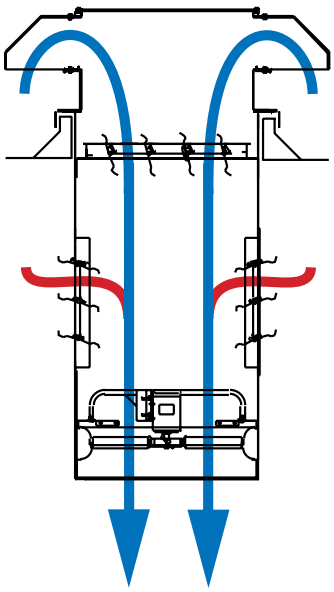
Introduction & Construction Features

Building ventilation requirements are often dictated by changes in the outside air temperature, production processes within a facility and / or occupancy within a facility. Loren Cook Company's Economizer Fan offers the flexibility to maintain comfortable temperatures in factories, gymnasiums, equipment rooms, warehouses, manufacturing plants or other facilities with a high internal heat load. The mixing of cool outside air with warm inside air, "free cooling," provides a more comfortable air temperature to any facility. It is the fan's most economical function. The Economizer Fan can also recirculate inside air, supply cool outside air to a facility, or exhaust warm or contaminated air.

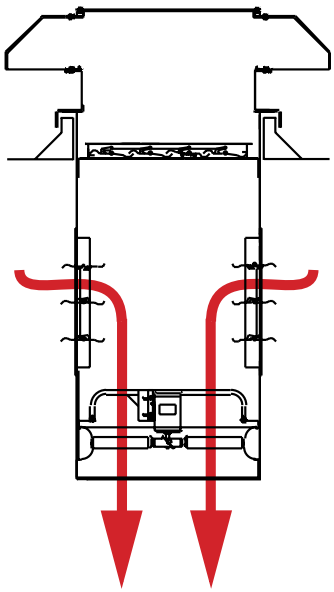
MRS-D
MRSF-D
MRSE-D

- Steel curb cap with continuously welded corners and Lorenized™ fan finish.
- 14 gauge galvanized steel plenum with two access doors.
- Heavy duty galvanized steel control dampers.
- Galvanized steel hood.
- Bird screen.
- Corrosion resistant fasteners.
- Heavy duty steel power assembly with extruded aluminum propeller.

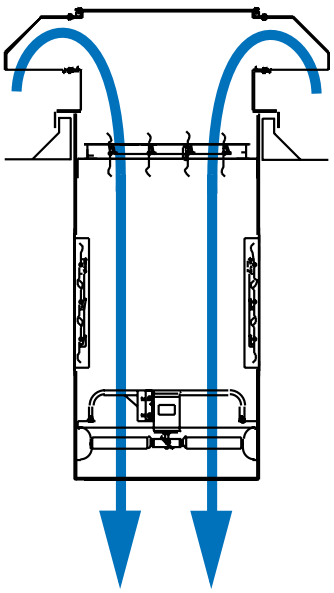
Operation Modes



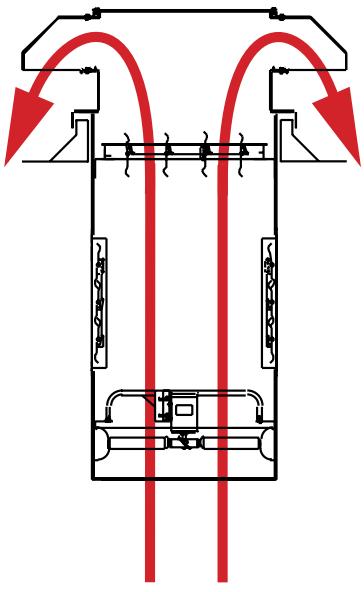
Mix
Cool outside air is mixed with warm inside air to provide more comfortable building temperatures.



Recirculation
Warm inside air at roof level is forced downward to reduce heating costs.



Supply
Cool outside air is supplied into the building to reduce cooling costs.



Exhaust
Warm or contaminated inside air is exhausted from the building.

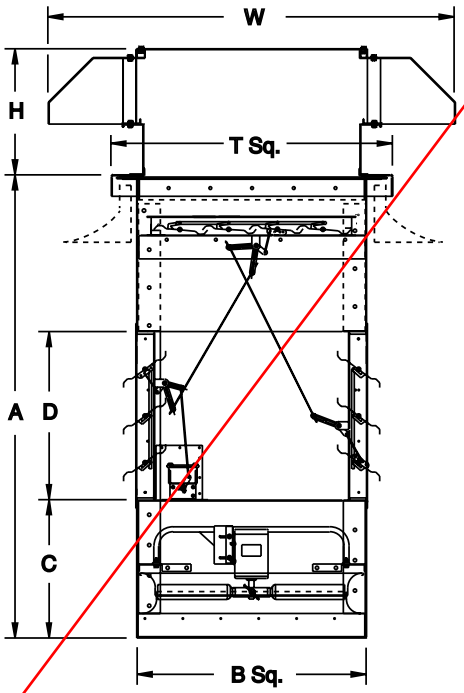
Typical Specifications and Dimensions

MRS-D: Mix-Recirculate-Supply Prop. Roof Fan

- Description - Fan shall be hooded, roof mounted, direct driven, propeller economizer fan.
- Operation Modes - Mix outside air with recirculated air, recirculate inside air, supply outside air.
- Certification - Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705).
- Construction - The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The hood shall be constructed of 18 gauge galvanized steel. The hood base shall be minimum 14 gauge Lorenized steel with continuously welded curb cap corners. The plenum shall be constructed of 14 gauge galvanized steel and provided with integral lifting lugs, propeller safety screen and two access doors. Outside air damper and recirculated air dampers shall be constructed of galvanized steel frame and blades. The motor shall be mounted to a minimum 14 gauge tubular steel power assembly. The propeller shall be located in a double venturi for efficient air flow in all modes of operation. Unit shall bear an engraved aluminum nameplate. Unit shall be shipped in ISTA certified transit tested packaging.
- Propeller - Propeller shall be extruded aluminum airfoil design with cast aluminum hub. The blade pitch shall be factory set and locked using set screws and roll pin. The hub shall be keyed and locked to the shaft utilizing two set screws or a taper lock bushing. Propeller shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.
- Motor - Motor shall be Nema design B with class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.
- Product - Fan shall be model MRSE-D as manufactured by Loren Cook Company of Springfield, Missouri.

c UL us

Type Economizer Fan is furnished standard with UL 705 and CUL listing (Power Ventilator/ZACT) when furnished with factory supplied motor.



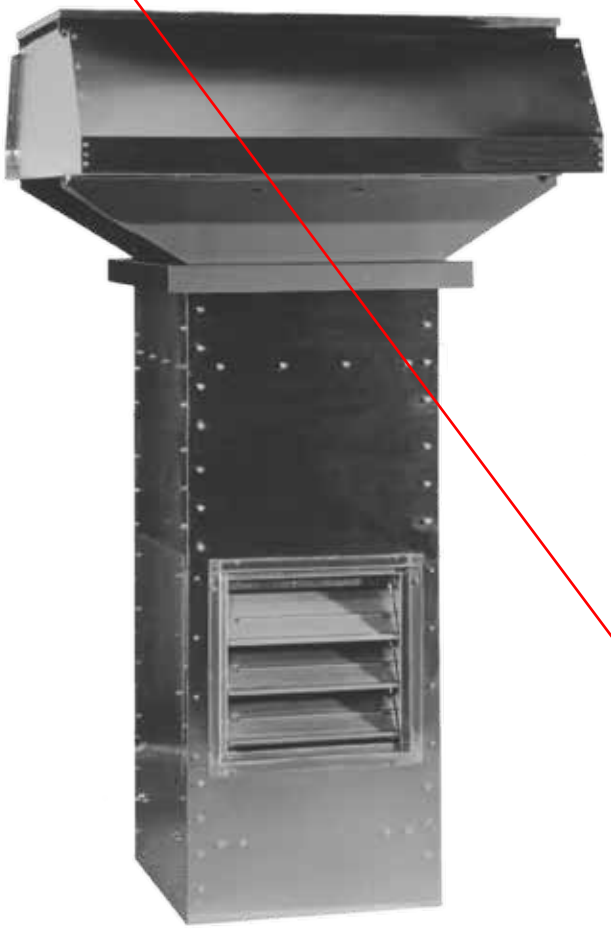
MRS-D Dimension Data

Size	A	B Sq.	C	D Sq.	H	W Sq.	T Sq.	Material Gauge			Roof Opening Square*	Approx. Ship Wt.-Lbs.
								Base	Hood	Plenum		
24	60-1/4	31-1/2	18	22-1/4	26	59	37-1/2	14	18	14	32-1/2	635
30	65-3/4	37-1/2	18	27-3/4	28	69	43-1/2	14	18	14	38-1/2	785
36	71-1/4	43-1/2	18	33-1/4	29	80	49-1/2	14	16	14	44-1/2	910
42	78-3/4	49-1/2	20	38-3/4	39	90	55-1/2	14	16	14	50-1/2	1125
48	84-1/4	55-1/2	20	44-1/4	39	90 x 110	61-1/2	14	16	14	56-1/2	1480
54**	89-3/4	61-1/2	20	49-3/4	42	109	67-1/2	14	18	14	62-1/2	1850

All dimensions in inches.
*Roof opening size for curbs supplied by Cook only.
**Sizes 54 require field assembly of hood.

Typical Specifications and Dimensions

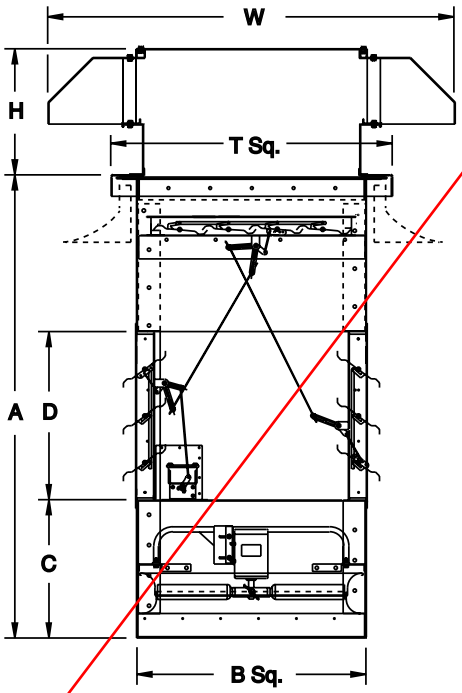
MRSF-D: Mix-Recirculate-Filtered Supply Prop. Roof Fan



- Description - Fan shall be hooded, roof mounted, direct driven, filtered, propeller economizer fan.
- Operation Modes - Mix filtered outside air with recirculated air, recirculate inside air, supply filtered outside air.
- Certification - Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705).
- Construction - The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The hood shall be constructed of 18 gauge galvanized steel. Filters shall be washable, 2 inch thick aluminum mesh type. The hood base shall be minimum 14 gauge Lorenized steel with continuously welded curb cap corners. The plenum shall be constructed of 14 gauge galvanized steel and provided with integral lifting lugs, propeller safety screen and two access doors. Outside air damper and recirculated air dampers shall be constructed of galvanized steel frame and blades. The motor shall be mounted to a minimum 14 gauge tubular steel power assembly. The propeller shall be located in a double venturi for efficient air flow in all modes of operation. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA certified transit tested packaging.
- Propeller - Propeller shall be extruded aluminum airfoil design with cast aluminum hub. The blade pitch shall be factory set and locked using set screws and roll pin. The hub shall be keyed and locked to the shaft utilizing two set screws or a taper lock bushing. Propeller shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.
- Motor - Motor shall be Nema design B with class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.
- Product - Fan shall be model MRSF-D as manufactured by Loren Cook Company of Springfield, Missouri.

c UL us

Type Economizer Fan is furnished standard with UL 705 and CUL listing (Power Ventilator/ZACT) when furnished with factory supplied motor.



MRSF-D Dimension Data

Size	A	B Sq.	C	D Sq.	H	W Sq.	T Sq.	Material Gauge			Roof Opening Square*	Approx. Ship Wt.-Lbs.
								Base	Hood	Plenum		
24	60-1/4	31-1/2	18	22-1/4	26	69	37-1/2	14	18	14	32-1/2	635
30	65-3/4	37-1/2	18	27-3/4	28	80	43-1/2	14	18	14	38-1/2	785
36	71-1/4	43-1/2	18	33-1/4	29	90	49-1/2	14	16	14	44-1/2	910
42	78-3/4	49-1/2	20	38-3/4	39	90 x 110	55-1/2	14	16	14	50-1/2	1125
48**	84-1/4	55-1/2	20	44-1/4	39	109	61-1/2	14	16	14	56-1/2	1480
54**	89-3/4	61-1/2	20	49-3/4	42	119	67-1/2	14	18	14	62-1/2	1850

All dimensions in inches.
*Roof opening size for curbs supplied by Cook only.
**Sizes 48 and 54 require field assembly of hood.

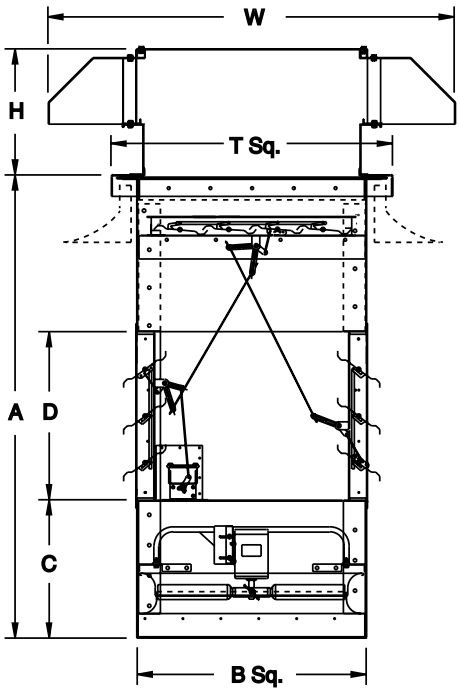
Typical Specifications and Dimensions

MRSE-D: Mix-Recirculate-Supply-Exhaust Prop. Roof Fan

- Description - Fan shall be hooded, roof mounted, direct driven, propeller economizer fan.
- Operation Modes - Mix outside air with recirculated air, recirculate inside air, supply outside air, exhaust inside air.
- Certification - Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705) and UL listed for Canada (cUL 705).
- Construction - The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The hood shall be constructed of 18 gauge galvanized steel. The hood base shall be minimum 14 gauge Lorenized steel with continuously welded curb cap corners. The plenum shall be constructed of 14 gauge galvanized steel and provided with integral lifting lugs, propeller safety screen and two access doors. Outside air damper and recirculated air dampers shall be constructed of galvanized steel frame and blades. The motor shall be mounted to a minimum 14 gauge tubular steel power assembly. The propeller shall be located in a double venturi for efficient air flow in all modes of operation. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA certified transit tested packaging.
- Propeller - Propeller shall be a reversible, extruded aluminum airfoil design with cast aluminum hub. The blade pitch shall be factory set and locked using set screws and roll pin. The hub shall be keyed and locked to the shaft utilizing two set screws or a taper lock bushing. Propeller shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.
- Motor - Motor shall be Nema design B with class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.
- Product - Fan shall be model MRSE-D as manufactured by Loren Cook Company of Springfield, Missouri.

c UL us

Type Economizer Fan is furnished standard with UL 705 and CUL listing (Power Ventilator/ZACT) when furnished with factory supplied motor.



MRSE-D Dimension Data

Size	A	B Sq.	C	D Sq.	H	W Sq.	T Sq.	Material Gauge			Roof Opening Square*	Approx. Ship Wt.-Lbs.
								Base	Hood	Plenum		
24	60-1/4	31-1/2	18	22-1/4	26	59	37-1/2	14	18	14	32-1/2	635
30	65-3/4	37-1/2	18	27-3/4	28	69	43-1/2	14	18	14	38-1/2	785
36	71-1/4	43-1/2	18	33-1/4	29	80	49-1/2	14	16	14	44-1/2	910
42	78-3/4	49-1/2	20	38-3/4	39	90	55-1/2	14	16	14	50-1/2	1125
48	84-1/4	55-1/2	20	44-1/4	39	90 x 110	61-1/2	14	16	14	56-1/2	1480
54**	89-3/4	61-1/2	20	49-3/4	42	109	67-1/2	14	18	14	62-1/2	1850

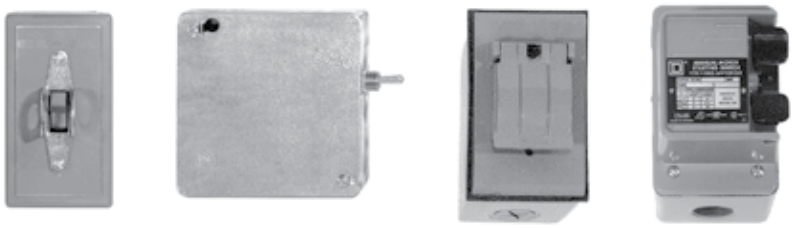
All dimensions in inches.
*Roof opening size for curbs supplied by Cook only.
**Sizes 48 and 54 require field assembly of hood.

Accessories

Four-Way Outlet Diffuser

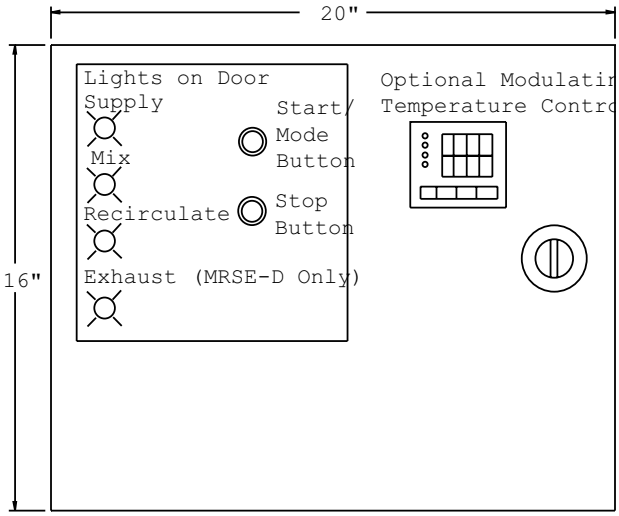
This diffuser is mounted to the bottom of the plenum to provide improved air distribution. The diffuser is constructed of 18 gauge steel and is coated with Cook's Lorenized™ fan finish.

Disconnect Switches



- NEMA 1 (Lockable) - Indoor, general purpose with lockable switch.
- NEMA 1 - Indoor, general purpose.
- NEMA 3R - Exterior mount, weather resistant.
- NEMA 4 - Water tight, dust tight.

Control Panel

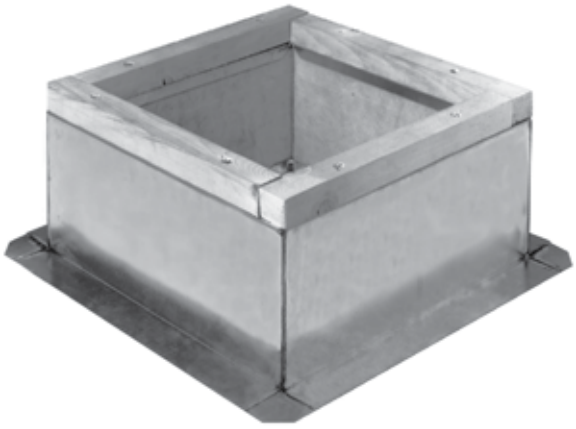


The optional remote mounted Economizer Control Panel allows fan operation and mode selection to be controlled from a convenient floor level location. All control components, including starters, are enclosed in a NEMA 1 cabinet with exterior start, stop and mode selection buttons. The model MRS/MRSF control panel allows for selection of the mix, recirculate, and supply modes. The model MRSE panel allows for selection of the mix, recirculate, supply and exhaust modes.

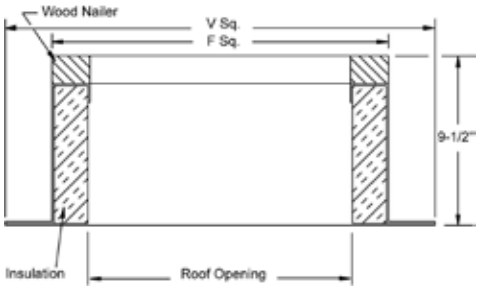
Wiring Requirements - Each panel requires 110V (5A) input for controls operation and a fused motor input. The output of each panel includes the motor circuit and three-wire damper control. A temperature probe connection is required with the optional modulating temperature control package.

Optional Modulating Temperature Control Package - This optional package for the control panels above, allows the outlet temperature to be selected when in mix mode. In mix mode, the temperature controller allows an operator to set a target outlet temperature for the fan. The controller reads the fan outlet temperature from a field-mounted, three-wire RTD (included) and modulates the dampers to produce an outlet temperature equal to the target temperature.

Curb



- 18 gauge galvanized steel (RCG) or .080 aluminum (RCA).
- 1-1/2", 3 lbs. density thermal and acoustical insulation.
- Continuously welded corners.
- Wood nailer.
- Options
- No wood nailer (deduct 1-1/2" from height).
- 13-1/2" tall construction.



Pre-Fabricated Curb Dimension Data

Unit	RCG	F Sq.	V Sq.	Roof Opening	Approx. Ship Wt.-Lbs.
24	RCG-35	35-1/2	39-1/2	32-1/2	43
30	RCG-41	41-1/2	45-1/2	38-1/2	50
36	RCG-47	47-1/2	51-1/2	44-1/2	85
42	RCG-53	53-1/2	57-1/2	50-1/2	96
48	RCG-59	59-1/2	63-1/2	56-1/2	106
54	RCG-65	65-1/2	69-1/2	62-1/2	116

All dimensions in inches.

Additional Accessories

- Aluminum hood and roof base
- Insulated low leakage top damper
- Cabinet extensions - 12" and 24"

Performance Data

MRS-D

Fan Size	Catalog Number	RPM	Motor HP	FA Sones	Static Presure											
					0"		.100"		.125"		.25"		.375"		.500"	
					CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
24	24MRS418D	1140	1/3	18.2	4736	0.30	4283	0.32	4158	0.32	3447	0.35	2534	0.33	-	-
	24MRS426D	1140	1/2	19.5	6002	0.55	5498	0.56	5384	0.56	4738	0.57	3567	0.54	2218	0.50
	24MRS628D	1140	3/4	26.0	6481	0.76	6088	0.76	5989	0.77	5455	0.81	4652	0.83	3745	0.81
	24MRS418D	1725	1	36.0	7167	1.04	6879	1.06	6805	1.07	6412	1.10	5984	1.14	5513	1.18
	24MRS422D	1725	1-1/2	34.0	8114	1.46	7731	1.48	7649	1.49	7275	1.51	6915	1.54	6513	1.57
	24MRS428D	1725	2	40.0	9498	2.15	9138	2.17	9055	2.18	8654	2.19	8257	2.19	7827	2.19
30	30MRS422D	860	1/2	21.0	7804	0.54	6971	0.56	6792	0.57	5571	0.58	3603	0.53	2125	0.51
	30MRS428D	860	3/4	23.0	9136	0.80	8295	0.81	8098	0.81	6787	0.81	4643	0.75	-	-
	30MRS628D	860	1	30.0	9433	0.97	8784	0.98	8618	0.99	7694	1.06	6242	1.07	-	-
	30MRS414D	1140	3/4	26.0	7822	0.69	7222	0.71	7084	0.72	6384	0.77	5467	0.78	4321	0.77
	30MRS420D	1140	1	27.0	9852	1.07	9265	1.14	9120	1.15	8371	1.18	7476	1.18	6314	1.18
	30MRS426D	1140	1-1/2	29.0	11580	1.63	10925	1.66	10778	1.66	10068	1.69	9256	1.70	7819	1.66
	30MRS432D	1140	2	39.0	12901	2.23	12399	2.24	12261	2.24	11471	2.26	10424	2.26	8986	2.19
36	36MRS414D	860	3/4	25.0	10114	0.72	9175	0.76	8957	0.77	7772	0.82	6070	0.82	4025	0.76
	36MRS616D	860	1	23.0	10910	1.06	10194	1.12	10026	1.13	9167	1.19	7981	1.24	6071	1.16
	36MRS424D	860	1-1/2	26.0	14242	1.53	13219	1.55	12991	1.56	11841	1.62	10039	1.60	7910	1.54
	36MRS412D	1140	1-1/2	33.0	11936	1.36	11150	1.41	10973	1.42	10127	1.48	9211	1.51	8063	1.53
	36MRS416D	1140	2	35.0	14494	1.92	13755	2.06	13578	2.08	12714	2.12	11832	2.12	10826	2.16
42	42MRS618D	680	1-1/2	21.0	14849	1.28	13935	1.38	13660	1.40	11968	1.46	10219	1.52	7009	1.33
	42MRS624D	680	2	24.0	17498	1.98	16477	2.03	16178	2.05	14265	2.18	12164	2.22	10507	2.15
	42MRS632D	680	3	34.0	20611	3.20	19739	3.30	19466	3.31	17296	3.33	14227	3.27	12135	3.09
	42MRS414D	860	1-1/2	33.0	15398	1.49	14244	1.50	13951	1.51	12468	1.59	11012	1.62	8994	1.60
	42MRS614D	860	2	30.0	15681	1.89	15129	1.93	14973	1.94	14031	1.99	12737	2.06	11236	2.21
	42MRS424D	860	3	35.0	20743	3.05	19665	3.16	19373	3.18	17759	3.20	15829	3.19	12851	3.05
	42MRS420D	1140	5	47.0	24689	5.42	23686	5.38	23467	5.39	22459	5.48	21510	5.61	20542	5.76
48	48MRS616D	680	2	27.0	20087	2.08	18754	2.14	18453	2.17	16989	2.31	15339	2.43	13069	2.44
	48MRS620D	680	3	31.0	23490	2.88	22508	3.06	22234	3.10	20644	3.26	18608	3.34	16425	3.40
	48MRS414D	860	3	42.0	22908	2.88	21596	2.89	21263	2.90	19580	3.01	17881	3.13	16226	3.14
	48MRS422D	860	5	45.0	29684	5.37	28492	5.49	28192	5.51	26654	5.61	24980	5.68	22909	5.71
	48MRS624D	860	7-1/2	45.0	32923	7.77	32058	7.84	31827	7.87	30558	8.03	29051	8.25	27211	8.49
	48MRS416D	1140	7-1/2	63.0	32225	7.71	31126	7.76	30875	7.78	29710	7.89	28618	8.01	27544	8.15
	48MRS420D	1140	10	61.0	36731	10.51	35555	10.43	35294	10.44	34092	10.53	32984	10.70	31904	10.91
54	54MRS416D	680	3	32.0	27298	2.94	25377	2.99	24957	3.01	22918	3.13	20467	3.22	17153	3.19
	54MRS424D	680	5	37.0	34655	5.25	32907	5.44	32436	5.47	29837	5.50	26740	5.48	22068	5.30
	54MRS414D	860	5	46.0	32533	5.17	31062	5.16	30690	5.18	28808	5.31	26904	5.50	25010	5.63
	54MRS420D	860	7-1/2	51.0	39352	8.10	37659	8.04	37291	8.06	35592	8.21	33980	8.43	32306	8.65
	54MRS424D	860	10	55.0	43828	10.62	42476	10.89	42123	10.94	40250	11.11	38176	11.14	35855	11.09

MRSF-D Selection Information

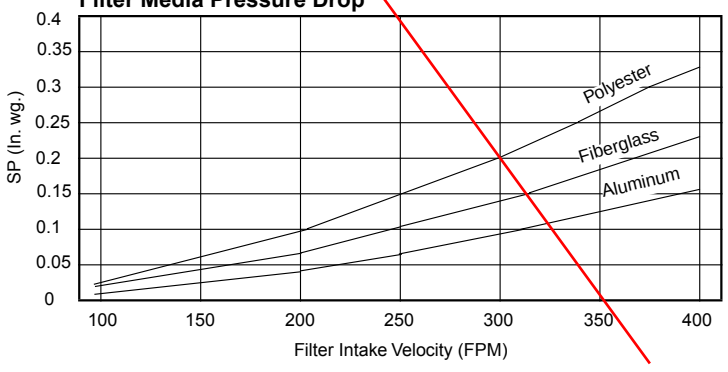
Use the tables to determine the additional pressure drop from the filters. Add this to the building static pressure and use the MRS-D performance data.

Filter Intake Velocity = $\frac{\text{Fan CFM}}{\text{Intake Area}}$

Fan Intake Area

Fan Model MRSF-D	Intake Area (SF)
24	21.5
30	28.75
36	36
42	44.5
48	55
54	65.5

Filter Media Pressure Drop



Performance Data

MRSE-D

Fan Size	Catalog Number	RPM	Motor HP	FA Sones	Static Presure											
					0”		.100”		.125”		.25”		.375”		.500”	
					CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
24	24MRSE616D	1140	1/3	21	3670	.24	3168	.27	3052	.27	2306	.30	1654	.33	-	-
	24MRSE428D	1140	1/2	21	5185	.45	4450	.47	4224	.47	3215	.50	2516	.56	-	-
	24MRSE434D	1140	3/4	29	5717	.58	4978	.59	4737	.59	3643	.63	2972	.72	2057	.79
	24MRSE618D	1725	1	46	5934	.92	5639	.95	5560	.96	5141	1.04	4699	1.13	4264	1.18
	24MRSE624D	1725	1-1/2	47	7513	1.49	7212	1.53	7130	1.54	6685	1.60	6167	1.67	5595	1.76
	24MRSE630D	1725	2	56	8510	2.10	8210	2.15	8126	2.16	7647	2.25	7047	2.35	6410	2.39
30	30MRSE422D	860	1/2	21	6387	.38	5344	.42	5037	.43	3607	.49	2114	.55	-	-
	30MRSE418D	1140	3/4	28	7357	.72	6631	.71	6426	.72	5352	.83	4258	.88	-	-
	30MRSE620D	1140	1	34	8225	.94	7759	.98	7616	1.00	6683	1.12	5670	1.19	4769	1.23
	30MRSE624D	1140	1-1/2	36	9608	1.29	9023	1.34	8859	1.36	7923	1.45	6824	1.55	5793	1.58
	30MRSE630D	1140	2	42	10883	1.82	10293	1.89	10120	1.91	9055	2.04	7792	2.07	6669	2.13
36	36MRSE416D	860	3/4	22	8608	.54	7391	.61	7087	.63	5324	.71	3670	.76	-	-
	36MRSE420D	860	1	26	10273	.83	9158	.86	8824	.90	7080	1.02	5370	1.05	3538	1.19
	36MRSE426D	860	1-1/2	28	12456	1.24	11375	1.35	10902	1.36	8854	1.42	6990	1.56	5451	1.68
	36MRSE420D	1140	2	40	13618	1.92	12837	1.92	12617	1.94	11377	2.17	10072	2.39	8732	2.31
42	42MRSE416D	860	1-1/2	34	12652	1.11	11225	1.20	10818	1.23	8962	1.39	6854	1.45	4878	1.53
	42MRSE422D	860	2	35	15940	1.87	14457	1.94	14135	1.97	12296	2.16	9854	2.23	8138	2.36
	42MRSE428D	860	3	41	19022	3.02	16901	3.08	16411	3.11	14000	3.24	11987	3.24	10384	3.44
	42MRSE424D	1140	5	56	22508	5.06	20859	5.16	20590	5.20	19390	5.41	18173	5.63	16079	5.80
48	48MRSE418D	680	1-1/2	29	15902	1.25	14073	1.35	13613	1.39	10571	1.56	7806	1.65	-	-
	48MRSE618D	680	2	27	16967	1.53	15630	1.68	15198	1.73	12898	1.97	10597	2.09	8594	2.20
	48MRSE426D	680	3	33	21262	2.55	19116	2.69	18499	2.72	14742	2.81	12325	2.97	9834	3.23
	48MRSE616D	860	3	39	18438	2.29	17188	2.60	16889	2.65	15394	2.83	13708	3.11	11916	3.26
	48MRSE620D	860	5	44	24258	4.06	22929	4.28	22599	4.33	20945	4.60	19237	4.87	17408	5.11
	48MRSE628D	860	7-1/2	52	30090	7.19	28979	7.16	28636	7.17	26157	7.52	23411	7.97	21492	8.09
	48MRSE414D	1140	5	69	22253	4.08	20729	4.20	20397	4.24	18851	4.47	17342	4.79	15696	5.18
	48MRSE618D	1140	7-1/2	71	28444	7.19	27749	7.44	27561	7.51	26500	7.85	25220	8.22	23762	8.62
	48MRSE424D	1140	10	75	33487	9.80	31433	9.93	31099	9.99	29654	10.29	28326	10.61	26878	10.94
54	54MRSE414D	680	2	32	18851	1.55	16249	1.68	15685	1.73	12613	2.00	9138	2.04	5967	2.19
	54MRSE616D	680	3	33	20704	2.03	18943	2.35	18521	2.40	16322	2.62	13787	2.88	11192	2.98
	54MRSE426D	680	5	39	30195	4.57	27838	4.78	27184	4.83	23176	5.00	19469	5.09	17010	5.41
	54MRSE418D	860	5	48	28561	4.53	26907	4.63	26507	4.68	24494	5.05	22173	5.47	19118	5.65
	54MRSE424D	860	7-1/2	59	35876	7.55	33129	7.72	32679	7.78	30659	8.12	28418	8.47	24901	8.70
	54MRSE624D	860	10	75	39150	9.95	37273	10.04	36863	10.11	34964	10.53	33141	11.05	31198	11.59
	54MRSE624D	860	10	55	43828	10.62	42476	10.89	42123	10.94	40250	11.11	38176	11.14	35855	11.09

LOREN COOK COMPANY

2015 E. DALE STREET

SPRINGFIELD, MO 65803-4637

417.869.6474

FAX 417.862.3820

lorencook.com

Economizer - November 1997

New Edition - April 2011

TAB 3

WARRANTY

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.

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.

TAB 4

START-UP FORMS

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-511
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Submittal is approved	☐	☐	☐	
b) O&M is submitted	☐	☐	☐	
c) Training date is set	☐	☐	☐	
d) Construction complete	☐	☐	☐	

II. Field Functional Test

1 Calibration/Loop/Electrical	Yes	No	NA	Comments:
1.1 Instrument commissioning complete	☐	☐	☐	
1.2 Electrical commissioning complete	☐	☐	☐	

2 Installation Check	Pass	Fail	NA	Comments:
2.1 Correct equipment tags have been installed.	☐	☐	☐	
2.2 Check for proper rotation	☐	☐	☐	
2.3 Check for tightness of fasteners	☐	☐	☐	
2.4 Check belt tension (if applicable)	☐	☐	☐	
2.5 Check bearings (lube if needed)	☐	☐	☐	
2.6 Check for obstructions	☐	☐	☐	

3 Operations Check	Pass	Fail	NA	Comments:
3.1 Operate equipment and listen for abnormalities	☐	☐	☐	
3.2 Verify rotation	☐	☐	☐	
3.3 Verify damper (if any) operates correctly	☐	☐	☐	
3.4 Feel for abnormal vibrations	☐	☐	☐	
3.5 Fan Motor Amp Draw	☐	☐	☐	FLA: ACTUAL:
ACTUAL				Line 1 Line 2 Line 3
3.6 Supply Voltage	☐	☐	☐	Ph 1-2 Ph 1-3 Ph 2-3

4 Controls Check	Pass	Fail	NA	Comments:
4.1 Local room control operates correctly	☐	☐	☐	
4.2 Simulate alarm conditions (if any) and verify function	☐	☐	☐	

5 Run Check	Pass	Fail	NA	Comments:
System was successfully operated for _____	☐	☐	☐	
(1 hour minimum = satisfactory check)				

6 Other Tests and Checks	Pass	Fail	NA	Comments:
7.1	☐	☐	☐	
7.2	☐	☐	☐	

III. Participants/Witness

Test Conducted By (signature & date):

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-511
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

	Company Name:
	Company Name:
Owner Witness (signature & date)	

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-516
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Submittal is approved	☐	☐	☐	
b) O&M is submitted	☐	☐	☐	
c) Training date is set	☐	☐	☐	
d) Construction complete	☐	☐	☐	

II. Field Functional Test

1 Calibration/Loop/Electrical	Yes	No	NA	Comments:
1.1 Instrument commissioning complete	☐	☐	☐	
1.2 Electrical commissioning complete	☐	☐	☐	

2 Installation Check	Pass	Fail	NA	Comments:
2.1 Correct equipment tags have been installed.	☐	☐	☐	
2.2 Check for proper rotation	☐	☐	☐	
2.3 Check for tightness of fasteners	☐	☐	☐	
2.4 Check belt tension (if applicable)	☐	☐	☐	
2.5 Check bearings (lube if needed)	☐	☐	☐	
2.6 Check for obstructions	☐	☐	☐	

3 Operations Check	Pass	Fail	NA	Comments:
3.1 Operate equipment and listen for abnormalities	☐	☐	☐	
3.2 Verify rotation	☐	☐	☐	
3.3 Verify damper (if any) operates correctly	☐	☐	☐	
3.4 Feel for abnormal vibrations	☐	☐	☐	
3.5 Fan Motor Amp Draw	☐	☐	☐	FLA: ACTUAL:
ACTUAL				Line 1 Line 2 Line 3
3.6 Supply Voltage	☐	☐	☐	Ph 1-2 Ph 1-3 Ph 2-3

4 Controls Check	Pass	Fail	NA	Comments:
4.1 Local room control operates correctly	☐	☐	☐	
4.2 Simulate alarm conditions (if any) and verify function	☐	☐	☐	

5 Run Check	Pass	Fail	NA	Comments:
System was successfully operated for _____	☐	☐	☐	
(1 hour minimum = satisfactory check)				

6 Other Tests and Checks	Pass	Fail	NA	Comments:
7.1	☐	☐	☐	
7.2	☐	☐	☐	

III. Participants/Witness

Test Conducted By (signature & date):

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-516
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

		Company Name:	
		Company Name:	
Owner Witness (signature & date)			

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-521
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Submittal is approved	☐	☐	☐	
b) O&M is submitted	☐	☐	☐	
c) Training date is set	☐	☐	☐	
d) Construction complete	☐	☐	☐	

II. Field Functional Test

1 Calibration/Loop/Electrical	Yes	No	NA	Comments:
1.1 Instrument commissioning complete	☐	☐	☐	
1.2 Electrical commissioning complete	☐	☐	☐	

2 Installation Check	Pass	Fail	NA	Comments:
2.1 Correct equipment tags have been installed.	☐	☐	☐	
2.2 Check for proper rotation	☐	☐	☐	
2.3 Check for tightness of fasteners	☐	☐	☐	
2.4 Check belt tension (if applicable)	☐	☐	☐	
2.5 Check bearings (lube if needed)	☐	☐	☐	
2.6 Check for obstructions	☐	☐	☐	

3 Operations Check	Pass	Fail	NA	Comments:
3.1 Operate equipment and listen for abnormalities	☐	☐	☐	
3.2 Verify rotation	☐	☐	☐	
3.3 Verify damper (if any) operates correctly	☐	☐	☐	
3.4 Feel for abnormal vibrations	☐	☐	☐	
3.5 Fan Motor Amp Draw	☐	☐	☐	FLA: ACTUAL:
ACTUAL				Line 1 Line 2 Line 3
3.6 Supply Voltage	☐	☐	☐	Ph 1-2 Ph 1-3 Ph 2-3

4 Controls Check	Pass	Fail	NA	Comments:
4.1 Local room control operates correctly	☐	☐	☐	
4.2 Simulate alarm conditions (if any) and verify function	☐	☐	☐	

5 Run Check	Pass	Fail	NA	Comments:
System was successfully operated for _____	☐	☐	☐	
(1 hour minimum = satisfactory check)				

6 Other Tests and Checks	Pass	Fail	NA	Comments:
7.1	☐	☐	☐	
7.2	☐	☐	☐	

III. Participants/Witness

Test Conducted By (signature & date):

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-521
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

	Company Name:
	Company Name:
Owner Witness (signature & date)	

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-526
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Submittal is approved	☐	☐	☐	
b) O&M is submitted	☐	☐	☐	
c) Training date is set	☐	☐	☐	
d) Construction complete	☐	☐	☐	

II. Field Functional Test

1 Calibration/Loop/Electrical	Yes	No	NA	Comments:
1.1 Instrument commissioning complete	☐	☐	☐	
1.2 Electrical commissioning complete	☐	☐	☐	

2 Installation Check	Pass	Fail	NA	Comments:
2.1 Correct equipment tags have been installed.	☐	☐	☐	
2.2 Check for proper rotation	☐	☐	☐	
2.3 Check for tightness of fasteners	☐	☐	☐	
2.4 Check belt tension (if applicable)	☐	☐	☐	
2.5 Check bearings (lube if needed)	☐	☐	☐	
2.6 Check for obstructions	☐	☐	☐	

3 Operations Check	Pass	Fail	NA	Comments:
3.1 Operate equipment and listen for abnormalities	☐	☐	☐	
3.2 Verify rotation	☐	☐	☐	
3.3 Verify damper (if any) operates correctly	☐	☐	☐	
3.4 Feel for abnormal vibrations	☐	☐	☐	
3.5 Fan Motor Amp Draw	☐	☐	☐	FLA: ACTUAL:
ACTUAL				Line 1 Line 2 Line 3
3.6 Supply Voltage	☐	☐	☐	Ph 1-2 Ph 1-3 Ph 2-3

4 Controls Check	Pass	Fail	NA	Comments:
4.1 Local room control operates correctly	☐	☐	☐	
4.2 Simulate alarm conditions (if any) and verify function	☐	☐	☐	

5 Run Check	Pass	Fail	NA	Comments:
System was successfully operated for _____	☐	☐	☐	
(1 hour minimum = satisfactory check)				

6 Other Tests and Checks	Pass	Fail	NA	Comments:
7.1	☐	☐	☐	
7.2	☐	☐	☐	

III. Participants/Witness

Test Conducted By (signature & date):

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-526
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

	Company Name:
	Company Name:
Owner Witness (signature & date)	

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-531
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Submittal is approved	☐	☐	☐	
b) O&M is submitted	☐	☐	☐	
c) Training date is set	☐	☐	☐	
d) Construction complete	☐	☐	☐	

II. Field Functional Test

1 Calibration/Loop/Electrical	Yes	No	NA	Comments:
1.1 Instrument commissioning complete	☐	☐	☐	
1.2 Electrical commissioning complete	☐	☐	☐	

2 Installation Check	Pass	Fail	NA	Comments:
2.1 Correct equipment tags have been installed.	☐	☐	☐	
2.2 Check for proper rotation	☐	☐	☐	
2.3 Check for tightness of fasteners	☐	☐	☐	
2.4 Check belt tension (if applicable)	☐	☐	☐	
2.5 Check bearings (lube if needed)	☐	☐	☐	
2.6 Check for obstructions	☐	☐	☐	

3 Operations Check	Pass	Fail	NA	Comments:
3.1 Operate equipment and listen for abnormalities	☐	☐	☐	
3.2 Verify rotation	☐	☐	☐	
3.3 Verify damper (if any) operates correctly	☐	☐	☐	
3.4 Feel for abnormal vibrations	☐	☐	☐	
3.5 Fan Motor Amp Draw	☐	☐	☐	FLA: ACTUAL:
ACTUAL				Line 1 Line 2 Line 3
3.6 Supply Voltage	☐	☐	☐	Ph 1-2 Ph 1-3 Ph 2-3

4 Controls Check	Pass	Fail	NA	Comments:
4.1 Local room control operates correctly	☐	☐	☐	
4.2 Simulate alarm conditions (if any) and verify function	☐	☐	☐	

5 Run Check	Pass	Fail	NA	Comments:
System was successfully operated for _____	☐	☐	☐	
(1 hour minimum = satisfactory check)				

6 Other Tests and Checks	Pass	Fail	NA	Comments:
7.1	☐	☐	☐	
7.2	☐	☐	☐	

III. Participants/Witness

Test Conducted By (signature & date):

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-531
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

	Company Name:
	Company Name:
Owner Witness (signature & date)	

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-536
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
a) Submittal is approved	☐	☐	☐	
b) O&M is submitted	☐	☐	☐	
c) Training date is set	☐	☐	☐	
d) Construction complete	☐	☐	☐	

II. Field Functional Test

1 Calibration/Loop/Electrical	Yes	No	NA	Comments:
1.1 Instrument commissioning complete	☐	☐	☐	
1.2 Electrical commissioning complete	☐	☐	☐	

2 Installation Check	Pass	Fail	NA	Comments:
2.1 Correct equipment tags have been installed.	☐	☐	☐	
2.2 Check for proper rotation	☐	☐	☐	
2.3 Check for tightness of fasteners	☐	☐	☐	
2.4 Check belt tension (if applicable)	☐	☐	☐	
2.5 Check bearings (lube if needed)	☐	☐	☐	
2.6 Check for obstructions	☐	☐	☐	

3 Operations Check	Pass	Fail	NA	Comments:
3.1 Operate equipment and listen for abnormalities	☐	☐	☐	
3.2 Verify rotation	☐	☐	☐	
3.3 Verify damper (if any) operates correctly	☐	☐	☐	
3.4 Feel for abnormal vibrations	☐	☐	☐	
3.5 Fan Motor Amp Draw	☐	☐	☐	FLA: ACTUAL:
ACTUAL				Line 1 Line 2 Line 3
3.6 Supply Voltage	☐	☐	☐	Ph 1-2 Ph 1-3 Ph 2-3

4 Controls Check	Pass	Fail	NA	Comments:
4.1 Local room control operates correctly	☐	☐	☐	
4.2 Simulate alarm conditions (if any) and verify function	☐	☐	☐	

5 Run Check	Pass	Fail	NA	Comments:
System was successfully operated for _____	☐	☐	☐	
(1 hour minimum = satisfactory check)				

6 Other Tests and Checks	Pass	Fail	NA	Comments:
7.1	☐	☐	☐	
7.2	☐	☐	☐	

III. Participants/Witness

Test Conducted By (signature & date):

Project Name:

Equipment Name:	ECONOMIZER EXHAUST FAN	**Tag No.**	DIF-FAN-07-536
Spec Name & #:	15830 FANS	**Model #:**	30MRSE
Test Date(s):		**Serial #**	WILL BE UPDATED ONCE FAN IS FABRICATED
Manufacurer:	LOREN COOK		

	Company Name:
	Company Name:
Owner Witness (signature & date)	