



When a unit is installed outdoors, optional outside air hood and exhaust hood must be installed to maintain ETL Certification.

**REZNOR** *Thomas & Betts*

# Model ERSA Energy Recovery Preconditioner for Makeup Air

INSTALLATION FORM RZ-NA 480-B  
Obsoletes Form RGM 480-A

APPLIES TO: Installation/Operation/Service

## TABLE OF CONTENTS

**Installation and Operation** ..... Paragraphs 1-12 ... Pages 1-11  
**Check Installation and Start-Up** ..... Paragraph 13 ..... Page 11  
**Optional Accessories** ..... Paragraphs 14-17 .Pages 11-14  
**Maintenance/Service** ..... Paragraph 18 ..... Page 15

INDEX	By Page No.
Adjusting Blower Speed .....	10
Belts and Drives .....	10, 15
Blower Rotation .....	10
Blowers .....	10, 15
Check/Test/Startup .....	11
Clearances .....	4
Description .....	1
Dimensions .....	3
Electrical Supply and Connections .....	6
Screened Exhaust Hood (Option) .....	13
Filters .....	10, 15
GENERAL .....	1
HAZARD INTENSITY LEVELS .....	1
Motors .....	15
Mounting .....	4

INDEX	By Page No.
Pre-Heater (Option) .....	11
Screened Outside Air Hood (Option) .....	13
Technical Data .....	2
Roof Curb (Option) .....	4, 14
Uncrating and Preparation .....	4
Vertical Supply and Return Air Kit (Option) .....	14
Voltage Conversion .....	6
Warranty .....	1
Energy Recovery Wheel .....	11, 15



Energy Recovery Wheel  
tested in accordance with  
ARI Standard 1060

Wiring Diagrams .....	8-9
-----------------------	-----

**REFERENCE: Replacement Parts Form RGM 780**

### HAZARD INTENSITY LEVELS

- DANGER: Failure to comply will result in severe personal injury or death and/or property damage.**
- WARNING: Failure to comply could result in severe personal injury or death and/or property damage.**
- CAUTION: Failure to comply could result in minor personal injury and/or property damage.**

### GENERAL

Installation should be done by a qualified agency in accordance with the instructions in this manual and in compliance with all codes and requirements of authorities having jurisdiction. The instructions in this manual apply to the Model ERSA Series of energy recovery preconditioners.

#### 1. Description/Application

The REZNOR® Model ERSA Series of makeup air preconditioners is specifically designed to reduce the energy required to heat or cool outside makeup air by as much as 80%. With outside air that has been "pre-conditioned" being supplied to the building's HVAC system, that system can more efficiently provide makeup air quantities recommended by the ASHRAE IAQ Standard (62-89).

The Model ERSA unit is a double-wall, insulated cabinet mounted on a curb cap base for installation outdoors or indoors. The cabinet provides for separate draw-through supply and exhaust airstreams. Each airstream includes a centrifugal blower and a filter bank. In the center of the cabinet, a motor slowly rotates a specially designed energy recovery wheel through the paths of both airstreams. Due to its special design, the wheel will transfer both sensible (temperature) and latent (moisture) energy from one airstream to the air in the other airstream. This allows the Model ERSA unit to both cool and dehumidify outdoor makeup air during the cooling season and heat and humidify outdoor makeup air in the heating season.

From the energy recovery unit, the conditioned outside air is ducted directly to the building's HVAC system, supplying the system with "conditioned" makeup air either warmer and more moist or cooler and dryer than the outside air. After either giving up or absorbing energy, the exhaust airstream is exhausted to the outdoors, providing a balance of air pressure and improved air quality in the building.

#### 2. Warranty

Refer to limited warranty information on the warranty card in the "Owner's Envelope".

### 3. Technical Data

Model ERSA	3			4			5					
CFM Range	850 - 2500			2000 - 4000			3500 - 6500					
Total Unit Amps @ Maximum HP	208/3	230/3	460/3	17.5	16.4	8.2	21.7	19.9	10.0	30.0	29.6	14.8
Motor Horsepower (2) - <b>Check rating plate</b>	1/4 - 2			1/2 - 3			1-1/2 - 5					
Blower Size (2)	10 x 10			15 x 11			15 x 15					
Energy Recovery Wheel Diameter	36"			42"			54"					
Energy Recovery Wheel Face Area (per airstream)	3.535 sq ft			4.811 sq ft			7.952 sq ft					
Pleated Filters - Total Quantity and Sizes	(6) 16x20x2"			(6) 20x25x2"			(16) 16x20x2"					
Approximate Net Wt (lbs)	809			948			1178					

**Figure 1 - Air Flow Arrangement (Top View)**

The unit has two separate, opposite flowing, draw-through airstreams --

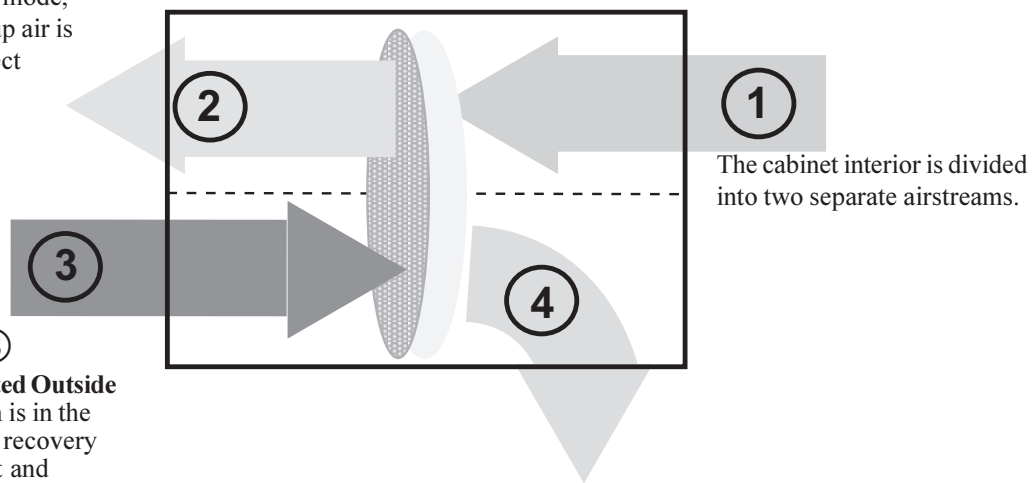
- ① Incoming fresh makeup air is "preconditioned" and ② discharged as supply air to the HVAC system
- ③ Return stale building air is ④ exhausted to the outdoors.

The energy recovery wheel transfers energy from one airstream to the other. The HVAC system is then supplied with fresh makeup air that has been either heated or cooled with moisture added or removed, reducing the amount of total energy required by that system to provide comfort-level air to the building.

**Preconditioned Supply Air ② to be Ducted to the HVAC System --** when the HVAC system is in the heating mode, the preconditioned makeup air entering the system is warmer and more moist than direct outside air; in the cooling mode, the preconditioned makeup air is cooler and dryer than direct outside air.

In the center of the cabinet, the energy recovery wheel slowly rotates through both airstreams transferring both sensible energy (temperature) and latent energy (humidity).

**Fresh Makeup Air ① Pulled from Outside to Provide Ventilation to the Building --** compared to air in the building, outside air is cooler and dryer in winter and warmer and more moist in summer; the ERSA unit greatly reduces those differences before the makeup air reaches the HVAC system.

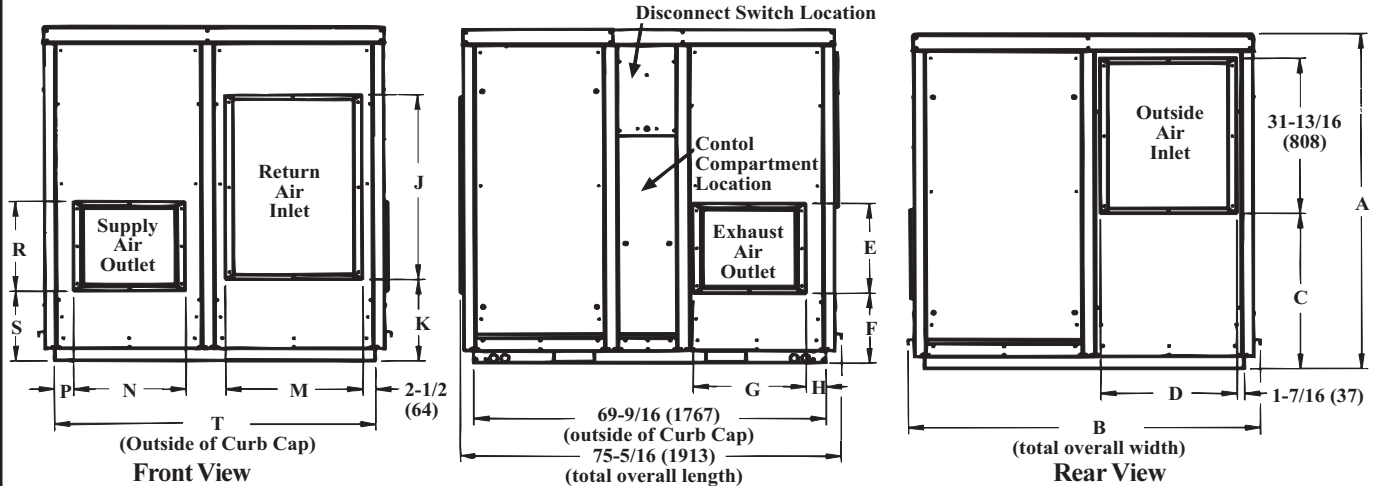


**Air from the Building ③ (return air) to be Exhausted Outside --** when the HVAC system is in the heating mode, the energy recovery wheel "recovers" the heat and humidity in the return air by transferring it to the incoming air; when in the cooling mode, the wheel transfers the unwanted heat and humidity from the incoming air to the airstream being exhausted to the outdoors.

**The Return Air ④ from Inside the Building is Exhausted to the Outdoors --** in winter the return air "gives up" its energy to the energy recovery wheel; in summer the return air "picks up" heat and humidity from the wheel.

## 4. Dimensions

Figure 2 - Dimensions (inches and mm) of Model ERSA with Horizontal Return and Discharge Air Openings



### Dimensions (inches)

Size	A	B	C	D	E	F	G	H	J	K	M	N	P	R	S	T
3	50-3/4	51-15/16	13-15/16	18-1/16	14	12	16-15/16	6-1/2	23	13-3/4	18	16-15/16	2-1/16	14	12	45-11/16
4	56-3/4	57-15/16	19-15/16	21-1/16	18-1/2	14-5/16	18-1/2	5-11/16	26	16-3/4	21	18-1/2	2-3/8	18-1/2	14-3/8	51-11/16
5	68-3/4	69-15/16	31-15/16	27-1/16	18-1/2	14-5/16	22-7/16	3-7/8	38	16-3/4	27	22-7/16	3-7/8	18-1/2	14-5/16	63-11/16

### Dimensions (mm)

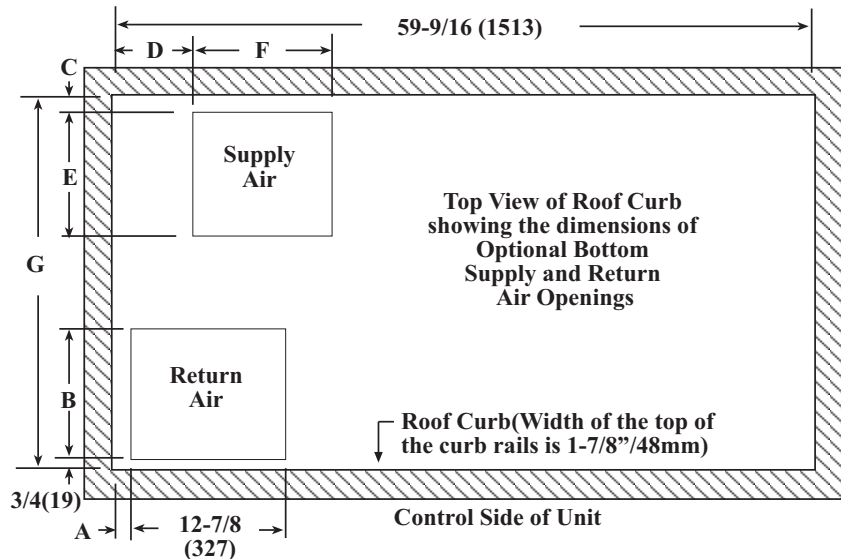
Size	A	B	C	D	E	F	G	H	J	K	M	N	P	R	S	T
3	1289	1319	354	459	356	305	430	165	584	349	457	430	52	356	305	1160
4	1441	1471	506	535	470	364	470	144	660	425	533	470	60	470	365	1313
5	1746	1776	811	687	470	364	570	98	965	425	686	570	98	470	364	1618

Horizontal Supply and Return Air Openings with Duct Flanges: Supply Air Outlet - R x N; Return Air Inlet - J x M

Figure 3 - Dimensions (inches and mm) of Vertical Supply Air and Return Air Duct Connections

ERSA	3	4	5
<b>Dimensions - inches</b>			
A	1-15/16	2-9/16	2-9/16
B	13-7/8	16-7/8	22-7/8
C	5/8	1-5/8	1-5/8
D	7-1/8	2-9/16	2-9/16
E	13-3/4	15-5/16	19-1/4
F	12-1/16	16-9/16	16-9/16
G	35-3/4	41-3/4	53-3/4
<b>Dimensions (mm)</b>			
A	49	65	65
B	352	429	581
C	16	41	41
D	151	65	65
E	349	389	489
F	306	421	421
G	908	1060	1365

Vertical Supply and Return Air Openings with Duct Flanges -- Supply Air Outlet - E x F; Return Air Inlet - B x 12-7/8



Dimensions to roof curb apply only to a unit mounted on an Option CJ1 roof curb. If a unit with bottom openings is being installed on a roof, it is recommended that the unit be mounted on a full roof curb.

### Dimensions May Be Affected by Options

Depending on how the unit was ordered, it could be equipped with horizontal supply and return air openings as shown in Figure 2; vertical supply and return air openings as shown in Figure 3; a vertical return air opening and horizontal supply air opening; or a horizontal return air opening and vertical supply air opening. The dimensions of the openings apply to all configurations.

This unit may be equipped with outside air and exhaust hoods, a pre-heater cabinet, or both. Refer to the Accessory Section (Paragraphs 14-15) for dimension changes when these accessories are included in the installation. The accessories are shipped separately for field installation. **NOTE: When a unit is installed outdoors, optional outside air hood and exhaust hood must be installed to maintain ETL Certification.**

## 5. Uncrating and Preparation

This unit was test operated and inspected at the factory prior to crating and was in operating condition. If the preconditioner has incurred any damage in shipment, file a claim with the transporting agency.

Read this booklet and become familiar with the installation requirements of your particular unit. If you do not have knowledge of local requirements, check with the local utility companies or any other local agencies who might have requirements concerning this installation.

Before beginning, make preparations for necessary supplies, tools, and manpower.

## 6. Clearances

Service Clearances **Control Side - 24" (610mm); Side Opposite Control Side - Width of the Unit**

## 7. Mounting

Before installing the energy recovery unit, check the supporting structure to verify that it has sufficient load-carrying capacity to support the weight.

ERSA 3	ERSA 4	ERSA 5
809 lbs	948 lbs	1178 lbs
367 kg	430 kg	534 kg

Holes are provided in the curb cap for lifting and for rigging. Use spreader bars when rigging to prevent chains or cables from damaging the cabinet.

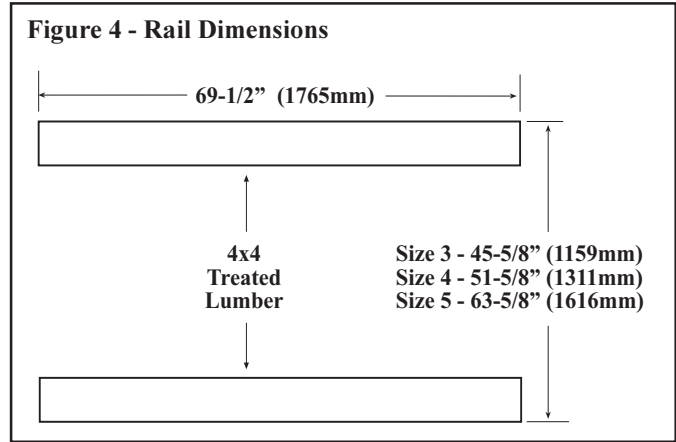
Prior to installation, be sure that the method of support is in agreement with all local building codes. The curb cap is designed to be placed either directly on a flat surface or to be mounted on rails or a roof curb.

When selecting a location for an outdoor installation, the outside air inlet should be located so that it will not draw in air being exhausted through other ventilating equipment, through heating equipment, or from any "contaminated" area. It is recommended that the unit be positioned so that the air inlet will not be facing into the prevailing wind. The mounting surface must be level.

## Mounting on Rails (Slab or Roof)

Whether the field-supplied rails are being mounted directly on a surface or being placed "up" on additional structure, the horizontal length of the system should be supported by two 4x4 treated wooden rails.

Space the 4x4 wooden rails so that the curb cap "skirt" will fit over the edge of the boards with the rails setting inside the horizontal length of the curb cap. Set the system on the rails.

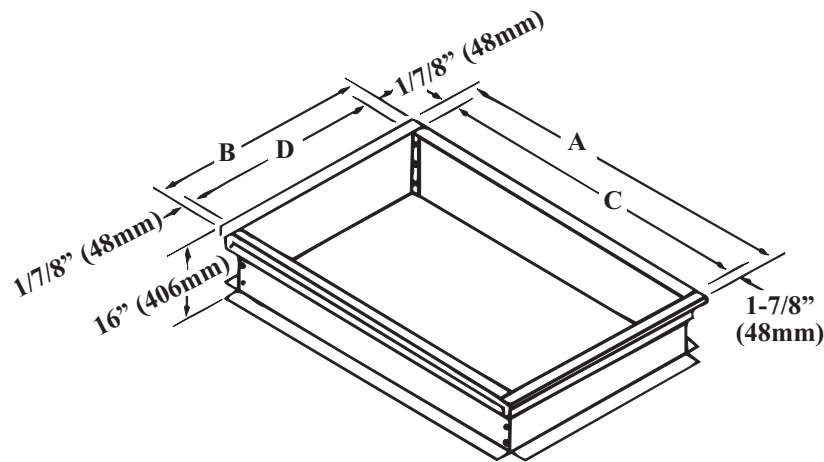


If the rails are supported by additional structure, add support under the rails across both ends and the center of the unit.

## Mounting on a Roof Curb

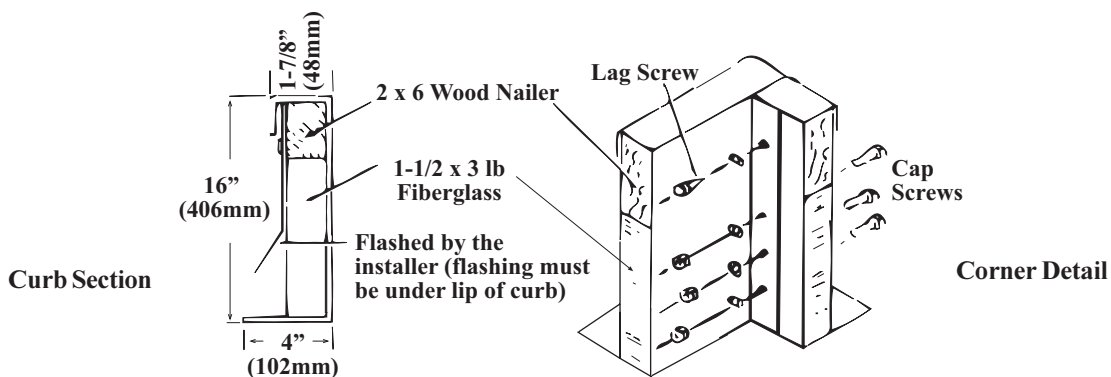
Whether using an optional roof curb supplied with the system or a field-supplied curb, the curb must be secure, square and level. The top surface of the roof curb must be caulked with 1/4" x 1-1/4" sealant tape or two 1/4" beads of suitable sealant. The unit must be sealed to the curb to prevent water leakage into the curb area due to wind blown rain and capillary action. The information and requirements in this section apply to all curbs; the curb assembly instructions apply to the curb option available with the unit.

**Figure 5 - Optional Roof Curb**



**Dimensions (inches and mm)**

Size	A		B		C		D	
	inches	mm	inches	mm	inches	mm	inches	mm
3	63-5/16	1608	39-1/2	1003	59-9/16	1513	35-3/4	908
4	63-5/16	1608	45-1/2	1156	59-9/16	1513	41-3/4	1060
5	63-5/16	1608	57-1/2	1461	59-9/16	1513	53-3/4	908



**Roof Curb Assembly and Installation Instructions**

Curbs are shipped unassembled. Field assembly and mounting on the roof are the responsibility of the installer. All required hardware necessary to complete the assembly is supplied. Before installing roof curb, verify that the size is correct for the system being installed.

1. Position curb cross rails and curb side rails as shown in Figure 5. Fasten curbing pieces at all corners with bolts and lag screws as shown in the Corner Detail illustration.
2. Check the assembly for squareness. Adjust the roof curb so that the diagonal measurements are equal within a tolerance of + or - 1/8" (3mm).
3. Level the roof curb. To ensure a good weathertight seal between the curb cap and the roof curb, the roof curb must be leveled in both directions with no twist end to end. Shim level as required and secure curb to roof deck before proceeding with flashing.
4. Install field-supplied flashing (See Figure 5).
5. Before placing the unit into position, apply furnished 1/4"x 1-1/4" foam sealant tape to top surface of curb, making good butt joint at corners. The unit must be sealed to the curb to prevent water leakage into the curb area due to blown rain and capillary action.

## 8. Electrical Supply and Connections

All electrical wiring and connections, including electrical grounding MUST be made in accordance with the National Electric Code ANSI/NFPA No. 70 (latest edition) or, in Canada, the Canadian Electrical Code, Part I-C.S.A. Standard C22.1. In addition, the installer should be aware of any local ordinances that might apply.

A separate line voltage supply should be run directly from the main electrical panel in the building to the disconnect switch factory installed on the unit. All external wiring must be within approved conduit and have a minimum temperature rise of 63°F. Conduit must be run so as not to interfere with the service panels.



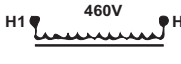
**WARNING: The standard 30 amp disconnect switch that is attached to the unit cannot be used for electrical service for an optional pre-heater. If the unit has an optional pre-heater, a larger field-supplied disconnect switch must replace the standard switch or an additional switch to service only the pre-heater must be installed. See the table on page 14.**

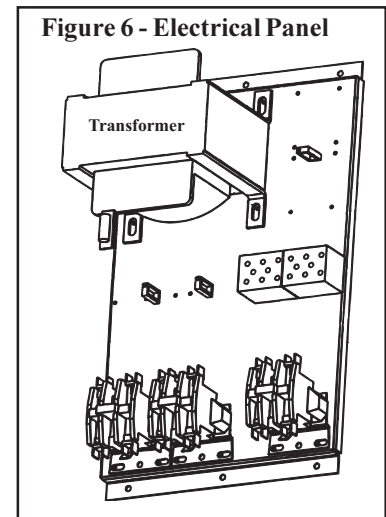
### Supply Voltage

This unit is available to be used with either 208/3, 230/3, or 460/3 voltage. Depending on how the unit was ordered, it is either

- factory wired for 208/3/60 supply voltage (Option AK5);
- factory wired for 230/3/60 supply voltage (Option AK6);
- factory wired for 460/3/60 supply voltage (Option AK7); or
- factory wired for 460/3/60 supply voltage but includes components to field convert for use with either 203/3/60 or 230/3/60 supply voltage (Option AK13).

Verify the voltage before installing the system. Open the control compartment door and verify the wiring connections on the supply side of the transformer.

- If the wiring is connected at Terminals H1 and H2, it is factory-wired for 208/3/60 supply voltage. 
- If the wiring is connected at Terminals H1 and H3, it is factory-wired for 230/3/60 supply voltage. 
- If the wiring is connected at Terminals H1 and H4, it is factory-wired for 460/3/60 supply voltage. 
- If the unit is factory wired for 460/3/60 (Terminals H1 and H4) and the actual supply voltage is either 208/3 or 230/3, check the electrical compartment for motor overloads supplied (part of Option AK13) to convert the unit for use with either 208/3 or 230/3 supply voltage.  
To convert the unit, locate the overloads and follow the instructions below.



There are *two* steps to the voltage conversion - 1) **Changing the Motor Overloads**, and 2) **Changing the Transformer and Motor Wiring**.

1) **Changing the Motor Overloads** - Refer to the wiring diagram on the unit.

<b>APPLIES TO: Model ERSA Unit equipped with</b>		<b>Optional Starter (Option AN10)</b>	<b>NOTES:</b>
<b>Motors</b>			
1/4 HP Open Dripproof (Option AL2)		N/A*	<p>*These motors do not have internal overload protection and are always equipped with an external starter. "<b>Changing the Overload</b>" is a required step in field conversion when the unit is equipped with these motors.</p> <p>**These motors have internal overload protection. If a unit with these motors does not have Option AN10, proceed to Step 2) Changing the Wiring. <b>If the motors have optional external starters</b> (Option AN10), continue with "Changing the Overload".</p> <p>(NOTE: 2HP energy efficient motors are not tri-volt- age. If the unit is equipped with 2HP energy efficient motors (Option AL38), it is factory-built to operate on a specific supply voltage and cannot be converted in the field.</p>
1/3 HP Open Dripproof (Option AL3)		N/A*	
1/2 HP Open Dripproof (Option AL4)		Yes**	
3/4 HP Open Dripproof (Option AL5)		Yes**	
1 HP Open Dripproof (Option AL6)		Yes**	
1-1/2 HP Open Dripproof (Option AL7)		Yes**	
2 HP Open Dripproof (Option AL8)		Yes**	
3 HP Open Dripproof (Option AL9) or Energy Efficient Option AL39)		N/A*	
5 HP Open Dripproof (Option AL10) or Energy Efficient Option AL40)		N/A*	



## Instructions - Changing the Motor Overloads

1. Packaged inside the unit, there are two starter overloads - one for use with each blower motor starter. From the chart below, find the blower motor type of the unit being installed and the supply voltage. Select the overloads to be used by their manufacturer's number and match the number to the identification number of the overloads packaged in the unit.

Option	Motor Type HP	Style	Electrical Supply Voltage	Phase	Overload GE#	Overload P/N
AL2	1/4	Open	208	3	RTA1-G	151187
	1/4	Open	230	3	RTA1-G	151187
	1/4	Open	460	3	RTA1-E	151185*
AL3	1/3	Open	208	3	RTA1-G	151187
	1/3	Open	230	3	RTA1-H	151188
	1/3	Open	460	3	RTA1-E	151185*
AL4	1/2	Open	208	3	RTA1-J	151189
	1/2	Open	230	3	RTA1-J	151189
	1/2	Open	460	3	RTA1-F	151186*
AL5	3/4	Open	208	3	RTA1-K	151190
	3/4	Open	230	3	RTA1-K	151190
	3/4	Open	460	3	RTA1-G	151187*
AL6	1	Open	208	3	RTA1-K	151190
	1	Open	230	3	RTA1-K	151190
	1	Open	460	3	RTA1-G	151188*
AL7	1-1/2	Open	208	3	RTA1-L	151191
	1-1/2	Open	230	3	RTA1-L	151191
	1-1/2	Open	460	3	RTA1-J	151189*
AL8	2	Open	208	3	RT1-M	151192
	2	Open	230	3	RT1-M	151192
	2	Open	460	3	RT1-K	151190*
AL9	3	Open	208	3	RT1-N	151193
	3	Open	230	3	RT1-N	151193
	3	Open	460	3	RT1-L	151191*
AL10	5	Open	208	3	RT1-P	151194
	5	Open	230	3	RT1-P	151194
	5	Open	460	3	RT1-M	151192*
AL38 2HP energy efficient motors are not tri-voltage. If the unit is equipped with Option AL38, it is factory-built to operate on a specific supply voltage and cannot be converted in the field.						
AL39	3	EE	208	3	RT1-N	151193
	3	EE	230	3	RT1-N	151193
	3	EE	460	3	RT1-L	151191*
AL40	5	EE	208	3	RT1-P	151194
	5	EE	230	3	RT1-P	151194
	5	EE	460	3	RT1-M	151192*

**\*Overload factory-installed on the unit. If the site has 460/3 supply voltage, no changes are required.**

2. Open the control compartment doors. Locate the transformer and the starters. (Refer to Figure 7A.)
3. Locate and Remove the Overload (Refer to Figures 7B and 7C)
  - a) Locate the overload portion of the starter.
  - b) Mark and disconnect the wires attached to overload terminals T1, T2, and T3.
  - c) Using a screwdriver, loosen the screws marked T1, T2, and T3 on the top of the starter. Pull the overload away from the starter.

Figure 7A - Electrical Panel

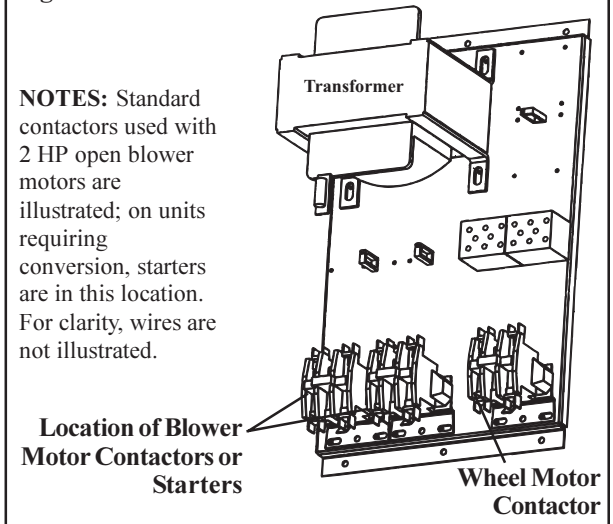


Figure 7B - Top View of Starter with Overload

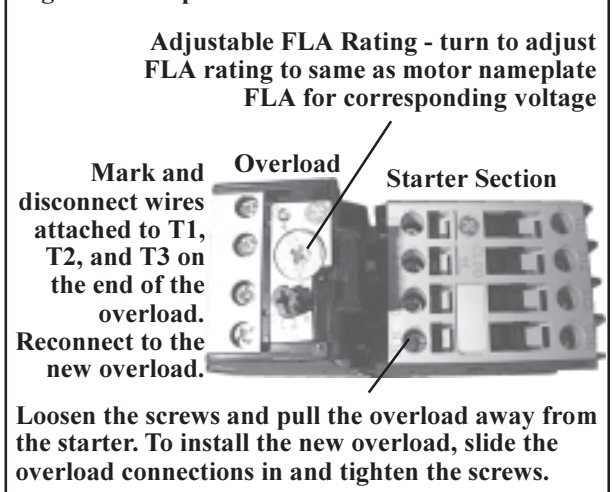
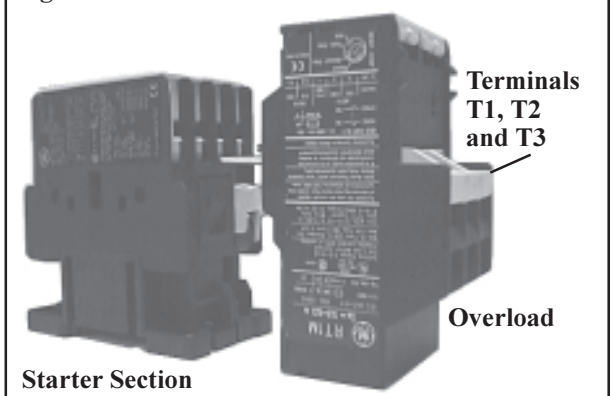


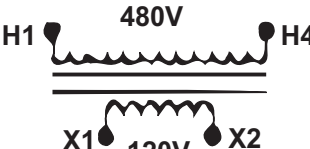
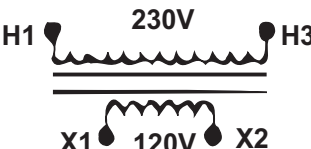
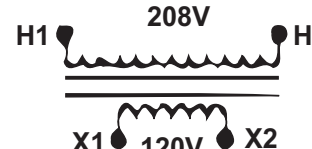
Figure 7C - Side View of Starter and Overload



4. Select the overload that matches the supply voltage.
    - a) Position the overload next to the starter and slide the connections into the starter section.
    - b) Tighten the screws on the top of the starter.
    - c) Re-connect the wires to Terminals T1, T2, and T3 on the new overload.
    - d) Adjust the overload (Refer to Figure 7B) to the FLA rating shown on the motor nameplate for the corresponding voltage.
- Change the overload on both motor starters.

# 8. Electrical Supply and Connections (cont'd)

## 2) Changing the Transformer and Motor Wiring - See below or refer to the wiring diagram on the unit.

Transformer Wiring Changes	Factory Wiring 480V H1 H4 X1 120V X2	Changes for 230 Volt 230V H1 H3 X1 120V X2	Changes for 208 Volt 208V H1 H2 X1 120V X2
			

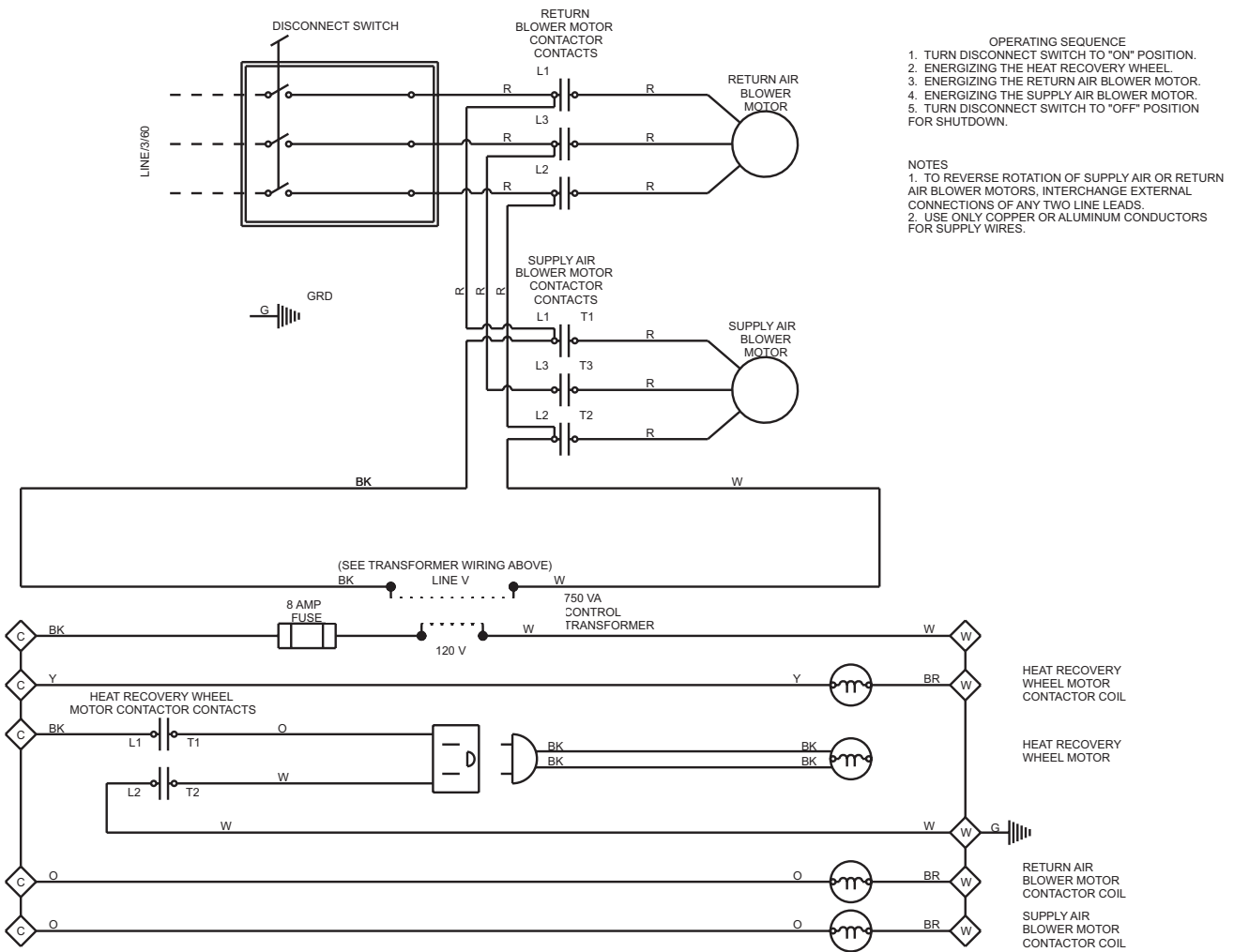
### Motor Wiring Changes

Refer to the plate on the motor and make required connections for the supply voltage being used.

### Typical Wiring Diagrams

Refer to the wiring diagram on the unit for specific information.

Figure 8 -- Typical Wiring Diagram for a Model ERSA with Blower Motors with Contactors



- OPERATING SEQUENCE
1. TURN DISCONNECT SWITCH TO "ON" POSITION.
  2. ENERGIZING THE HEAT RECOVERY WHEEL.
  3. ENERGIZING THE RETURN AIR BLOWER MOTOR.
  4. ENERGIZING THE SUPPLY AIR BLOWER MOTOR.
  5. TURN DISCONNECT SWITCH TO "OFF" POSITION FOR SHUTDOWN.

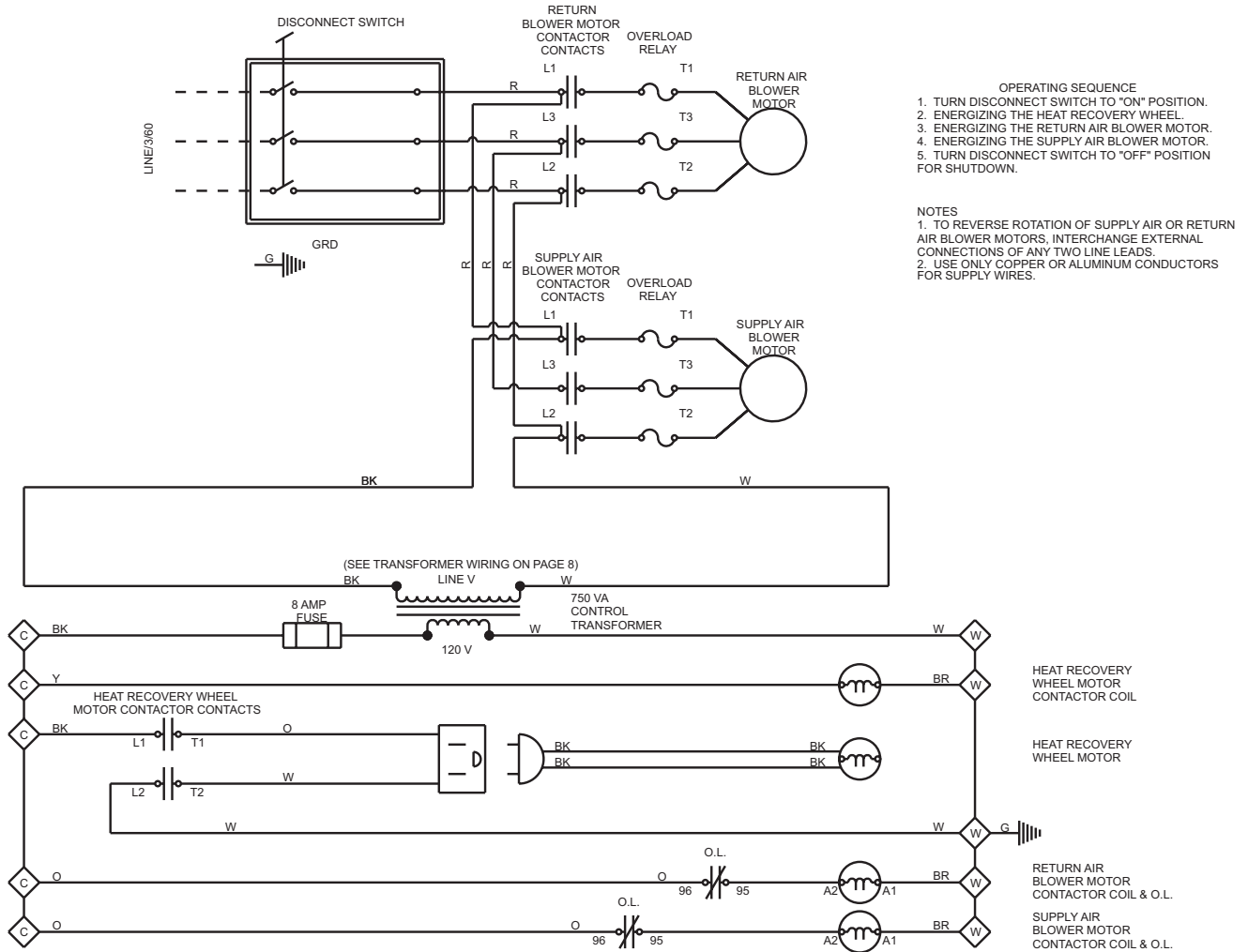
- NOTES
1. TO REVERSE ROTATION OF SUPPLY AIR OR RETURN AIR BLOWER MOTORS, INTERCHANGE EXTERNAL CONNECTIONS OF ANY TWO LINE LEADS.
  2. USE ONLY COPPER OR ALUMINUM CONDUCTORS FOR SUPPLY WIRES.

ERSA - 3 WD# 150554 REV. #1

**NOTE:** Transformer and motor wiring connections for tri-voltage motors are illustrated on the components and on the wiring diagram attached to the unit.



**Figure 9 - Typical Wiring Diagram for a Model ERSA with Blower Motors with Motor Starters**



ERSA - 3, 4 & 5 WD# 150555 REV #2

**NOTE:** Transformer and motor wiring connections for tri-voltage motors are illustrated on the components and on the wiring diagram attached to the unit.

## 9. Blowers, Blower Belts and Drives

Check belt tension. Proper belt tension is important to the long life of the belt and motor. A loose belt will cause wear and slippage. Too much tension will cause excessive motor and blower bearing wear. Adjust the belt tension by turning the adjusting screw on the motor base until the belt can be depressed 3/4".

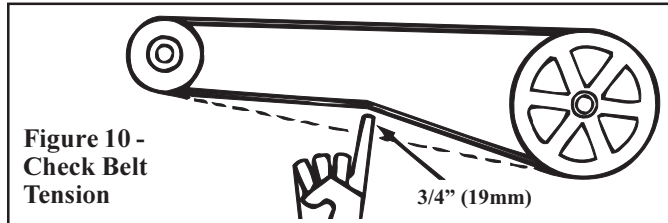


Figure 10 -  
Check Belt  
Tension

After correct tension is achieved, re-tighten the locknut on the adjustment screw. Be sure that the belt is aligned in the pulleys.

### Adjusting Blower Speed

The system is set at the factory for the RPM required to meet the CFM and external static pressure specified on the order. If estimated external static pressure is incorrect, or changes were made to the duct system, the blower RPM may have to be adjusted.

NOTE: It is recommended that the CFM of the exhaust air be approximately 3% greater than the supply air.

Motors are equipped with adjustable pitch pulleys which permit adjustment of blower speed.

**To make adjustments, follow these instructions.**

1. Turn off the electric power at the disconnect switch.
2. Loosen belt tension and remove the belt.
3. Loosen the set screw on the side of the pulley away from the motor.
4. **To increase the blower speed**, turn the adjustable half of the pulley inward. **To decrease the blower speed**, turn the adjustable half of the pulley outward. One turn of the pulley will change the speed 8-10%.
5. Tighten the set screw on the flat portion of the pulley shaft.
6. Replace the belt and adjust the belt tension. Adjust tension by turning the adjusting screw on the motor base until the belt can be depressed 3/4". Re-tighten the lock nut on the adjusting screw. Be sure that the belts are aligned in the pulley grooves properly and are not angled from pulley to pulley.
7. Repeat the adjustment to the other drive.
8. Turn on the electric.
9. Check the motor amps with an amp meter. The maximum motor amp rating on the motor nameplates must not be exceeded.

### Blower Bearings

The blower bearings are permanently lubricated cartridge ball bearings and do not require greasing.

### Blower Rotation

Each blower housing is marked for proper rotation. Rotation may be reversed by interchanging two wires on the 3-phase supply connections (see the Wiring Diagram).

## 10. Filters

Each airstream is equipped with a filter rack and 2" disposable pleated filters. The filters have an average efficiency of 30-35% with an arrestance of 90-93% (ASHRAE 52-76 Test Standard).

### Filters - Total Quantity and Sizes

Size 3 - (6) 16x20x2"

Size 4 - (6) 20x25x2"

Size 5 - (16) 16x20x2"

Filters are accessible by removing the door panels on the sides of the unit. Use only 2" pleated filters; do not operate without filters.

## 11. Energy Recovery Wheel

In the center of the cabinet, a motor slowly rotates a specially designed energy recovery wheel through the paths of both airstreams. The wheel is mounted in a removable, slide-out cassette which is accessible by removing the center door panel on the non-control side of the unit.

The energy recovery wheel is certified to ARI Standard 1060. It is constructed of a corrugated synthetic fiber-based media impregnated with a non-migrating water selective molecular sieve desiccant and mounted on a frame of evenly spaced galvanized steel spokes. The wheel is banded with galvanized steel and has an aluminum center hub. The wheel bearings have a life rating of 100,000+ hours.

The function of the wheel is to transfer both sensible (temperature) and latent (moisture) energy from one airstream to the air in the other airstream. This allows the unit to both cool and dehumidify outdoor makeup air during the cooling season and heat and humidify outdoor makeup air in the heating season.

During extremely cold outdoor conditions and very high humidity indoor conditions, frost formation in the wheel is a possibility. The exhaust airstream is the one most apt to develop frost formation. Frost formation will not harm the wheel itself, but will act to plug the wheel reducing the air flow. If frost formation is an application problem, it can be solved by heating the incoming outdoor air (See Option PH, Paragraph 14), by using an air bypass, or by temporarily de-energizing the unit.

## 12. Wheel Motor and Belt

The wheel is rotated by a motor mounted on the bottom of the cabinet and a non-adjustable belt drive. The speed of the rotation of the wheel is factory set to provide optimum energy transfer.

The belt is a 3/8" diameter continuous round belt that encircles the wheel and fits into the motor pulley channel. If it should be necessary to replace the motor or belt, use factory-approved replacement parts.

### Instructions to replace the wheel belt:

- 1) Turn off the electric power at the disconnect switch.
- 2) Remove the wheel access panel. Unplug the motor. Remove the two 1/4x20 bolts (one on the top) and one on the bottom that secure the wheel cartridge. Slide the cartridge out of the unit.
- 3) On the side of the wheel opposite the motor, remove the face mask panel that is directly across from the motor. The belt and motor pulley are visible.
- 4) In the center of the wheel, remove the 1/2-13 x 3/4" long cap screw and lockwasher. At the bottom, remove the screws that attach the end of the bearing channel (the vertical support that extends the diameter of the wheel).
- 5) Slide the belt off of the pulley and the wheel. Remove it completely by pulling slightly on the loosened bearing channel.
- 6) Install the new belt and re-assemble the unit.
- 7) Turn on the power and check for proper operation.

## 13. Check/Test/Startup

### Check the installation prior to start-up:

- Remove all shipping supports and restraints.
- Be certain the electrical supply matches the unit voltage.
- Check blower pulleys and motor pulleys to be sure they are secure to the shafts. Check belt tension and alignment. See Paragraph 9.

### Start-Up

- Turn electric supply on at the disconnect switch.

### Check installation after start-up:

- Check the amp rating of the motors. The actual operating current should not exceed the nameplate amp rating.
- Place "Owner's Envelope" containing Limited Warranty Card, this booklet, and any optional information in an accessible location near the heater. Follow the instructions on the envelope.

## Optional Accessories

### 14. Optional Electric Pre-Heater (Option PH)

When the outside air temperature is below 32°F and the exhaust air dry bulb temperature is below the dewpoint, frosting may occur on the wheel. If the relative humidity in the space exceeds 30% when the outdoor air temperature is below 5°F, the application should be evaluated to see if preheating the inlet air is required to prevent frosting.

To prevent frost from developing on the energy recovery wheel, the outside air entering the unit may be pre-heated with an electric heater. The heater is mounted in a cabinet and shipped separately for field installation. The pre-heater cabinet requires its own electrical supply connection.

Pre-Heater Size/Voltage	ERSA	Option
10KW-230V	3, 4, 5	PH1
20KW-230V	3, 4, 5	PH2
30KW-230V	4, 5	PH3
40KW-230V	5	PH4
10KW-460V	3, 4, 5	PH5
20KW-460V	3, 4, 5	PH6
30KW-460V	4, 5	PH7
40KW-460V	5	PH8

### Supply Wiring

All electrical wiring and connections, including electrical grounding MUST be made in accordance with the National Electric Code ANSI/NFPA No. 70 (latest edition) or, in Canada, the Canadian Electrical Code, Part I-C.S.A. Standard C22.1. In addition, the installer should be aware of any local ordinances that might apply.

The pre-heater requires its own supply voltage connection. A separate line voltage supply should be run directly from the main electrical panel in the building to a disconnect switch. All external wiring must be within approved conduit and have a minimum temperature rise of 60°C.

**WARNING: The standard 30 amp disconnect switch that was included as part of the unit cannot be used for electrical service for the pre-heater. A larger disconnect switch must replace the standard switch, or an additional switch to service only the pre-heater must be installed. See table below for amp requirements.**

Size of Pre-Heater	208V* Amps	230V Amps	460V Amps
10KW	26.6	24.0	12.0
20KW	53.4	48.1	24.1
30KW	80.1	72.2	36.1
40KW	106.8	96.2	48.1
Unit Amps @ Maximum HP (without the pre-heater)			
ERSA 3	14.5	14.1	8.3
ERSA 4	19.1	17.3	9.9
ERSA 5	30.0	25.7	14.1
* The 230 volt electric pre-heater can be operated with a 208 supply voltage at a 25% derating.			

# 14. Optional Electric Pre-Heater (cont'd)

## Controls

The pre-heater is controlled by a field-adjustable temperature control (-30 to 100°F) located in the pre-heater control compartment. The sensor is located at the pre-heater discharge. When the temperature of the air leaving the pre-heater is below the setpoint, the heater will activate to pre-heat the air before it reaches the wheel.

The pre-heater cabinet is also equipped with an airflow proving switch to verify blower operation. The pre-heater will not activate unless the blower is operating. The airflow proving switch is located in the pre-heater control compartment; the airflow proving switch sensor requires field installation.

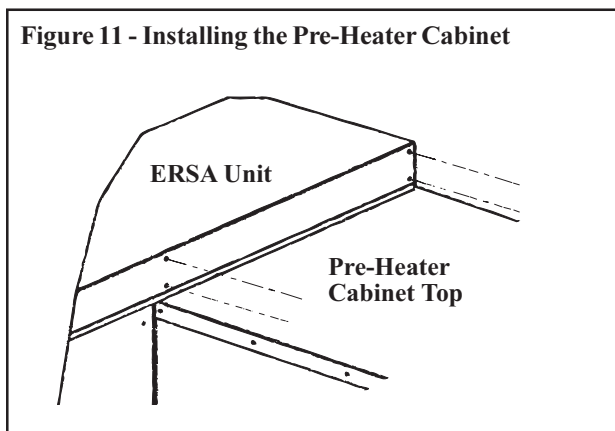
## Installation Instructions

Verify that the pre-heater is the correct size and voltage and that the disconnect is adequate. **Do not install the pre-heater cabinet while the unit is in operation. On units with an outside air hood, install the pre-heater cabinet in the ERSA cabinet opening before installing the air hood.** After the pre-heater is installed, install the outside air hood in the pre-heater cabinet opening.

Locate the parts bag shipped in the pre-heater control compartment. Refer to the wiring diagram on the pre-heater and to the pre-heater instruction booklet.

### 1. Install the Pre-Heater Cabinet

- a) Remove the duct connector assembly that is factory-installed in the opening.
- b) Refer to Figure 11. Above the outside air inlet opening, remove the four factory-installed screws attaching the cabinet top. Slide the edge of the pre-heater cabinet under the filter cabinet top and the sides of the cabinet into the "slots" in the filter cabinet. **The pre-heater top panel edge must be between the filter cabinet top and end panel.** Reinsert the four sheet metal screws in the cabinet top.



- c) Under the pre-heater cabinet, attach each corner using #10-16x1/2" long self-drilling screws.

### 2. Install the Airflow Proving Switch Sensor -

To verify blower operation the airflow proving switch sensor must be mounted on the blower housing.

- a) Locate the airflow proving (pressure) switch in the pre-heater control compartment and attach the tubing.

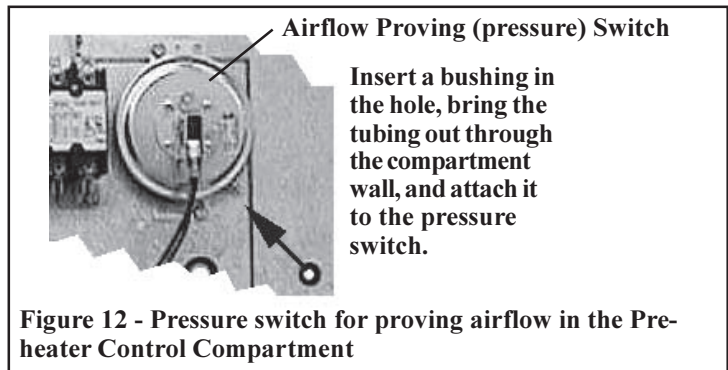
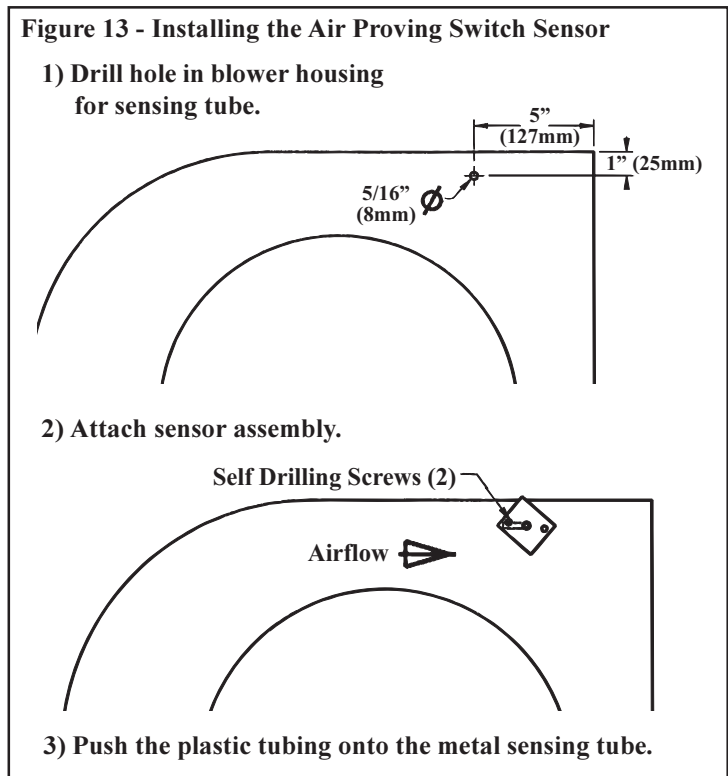


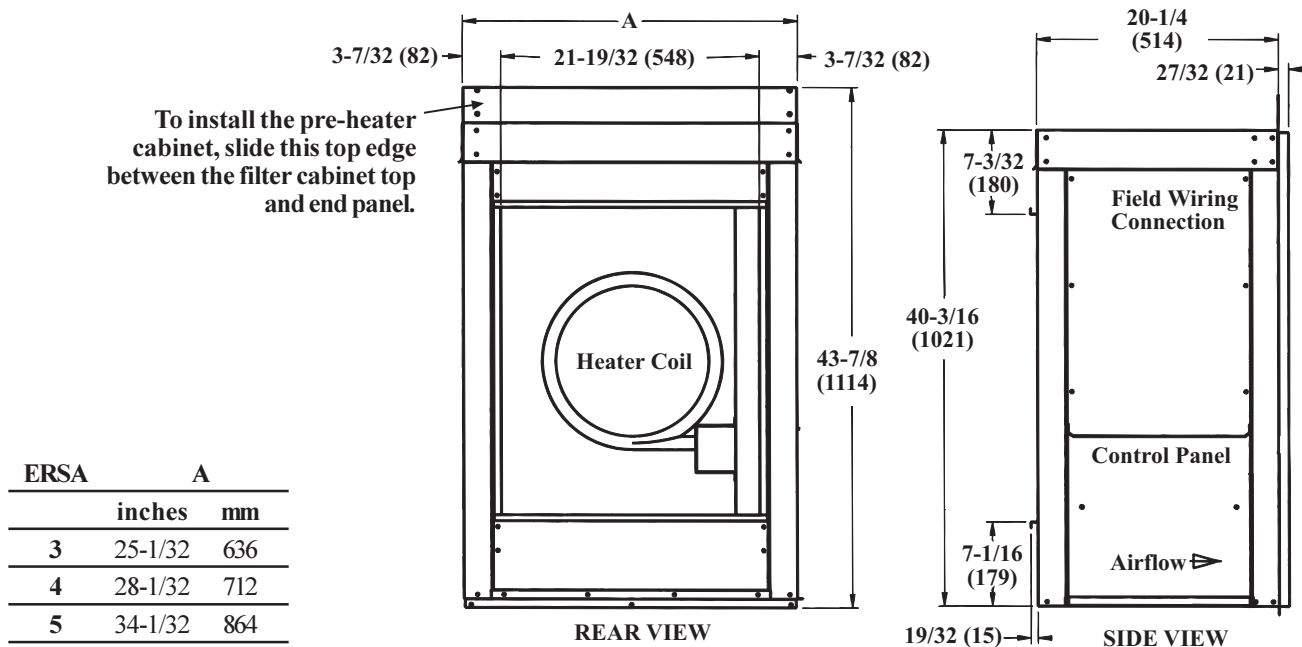
Figure 12 - Pressure switch for proving airflow in the Pre-heater Control Compartment

- b) Inside the unit, route the tubing, using bushings and cable clamps as needed (**IMPORTANT NOTE: Attach cable clamps through inner panel only.**)
  - > up the inside of the pre-heater cabinet (maintain a safe distance from the electric element) toward the top of the ERSA cabinet opening;
  - > through the opening and across the top of the filter section, using a bushing to go through the hole in the filter rack and cable holders as needed, to the wheel section;
  - > remove the hole plug in the wheel section cabinet wall, insert a bushing, and run the tubing through the hole and across the section above the wheel cassette;
  - > remove the hole plug in the cabinet wall, insert the last bushing, and run the tubing through the wall;
  - > using cable holders as needed, run the tubing across the top and down to the blower housing.
- c) Refer to Figure 13 and locate the hole position; drill a 5/16" hole in the blower housing. Push the sensing end of the tube through the hole. Position the sensor assembly so that the sensor opening on the inside of the blower housing is **facing into the blower airstream**. Using the two remaining screws, attach the assembly to the blower housing. On the outside of the blower housing, push the plastic tubing over the metal sensing tube.



3) Push the plastic tubing onto the metal sensing tube.

**Figure 14 - Dimensions (inches and mm) of Optional Pre-Heater Cabinet**



## 15. Screened Outside Air Hood with Louvers and Screened Exhaust Hood (Option AS14) - Both hoods are required for ETL approval.

Both the outside air hood and exhaust hood are weatherized, screened hoods designed to be field assembled and installed on the cabinet. The air hood includes a louver assembly designed to help eliminate moisture from the inlet air. Complete installation instructions and all required hardware are packaged in the option kit.

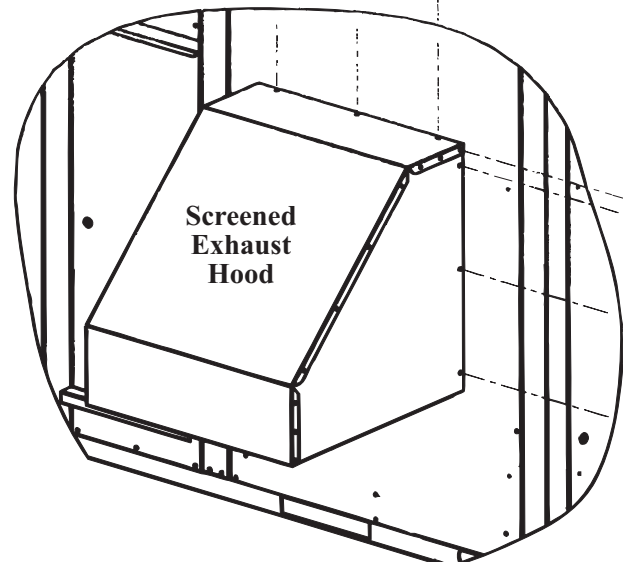
### Installation Instructions - Exhaust Hood

Refer to Figure 15. The exhaust hood is shipped unassembled; it requires assembly and installation.

To avoid possible damage, it is recommended that the exhaust hood be installed after the system has been placed on the roof or slab. The hood should be installed before the unit is operated. Do not install the hood while the unit is in operation.

1. **Assemble the Hood** (All screws ends should be inside the hood.)
  - a) Using sheet metal screws, attach the sides of the hood to the top.
  - b) Position the screen in the hood opening. Hold the screen angles in place and attach with sheet metal screws.
2. **Install the Assembled Hood** -- Position the hood around the duct connector flange and attach as shown in Figure 15.

**Figure 15 - Field Assemble and Install the Screened Exhaust Hood**





## Optional Accessories (cont'd)

### 15. Screened Outside Air Hood with Louvers and Screened Exhaust Hood (cont'd)

**CAUTION:** It is recommended that the inlet to the outside air hood NOT be facing into the prevailing wind.

#### Installation Instructions - Outside Air Hood

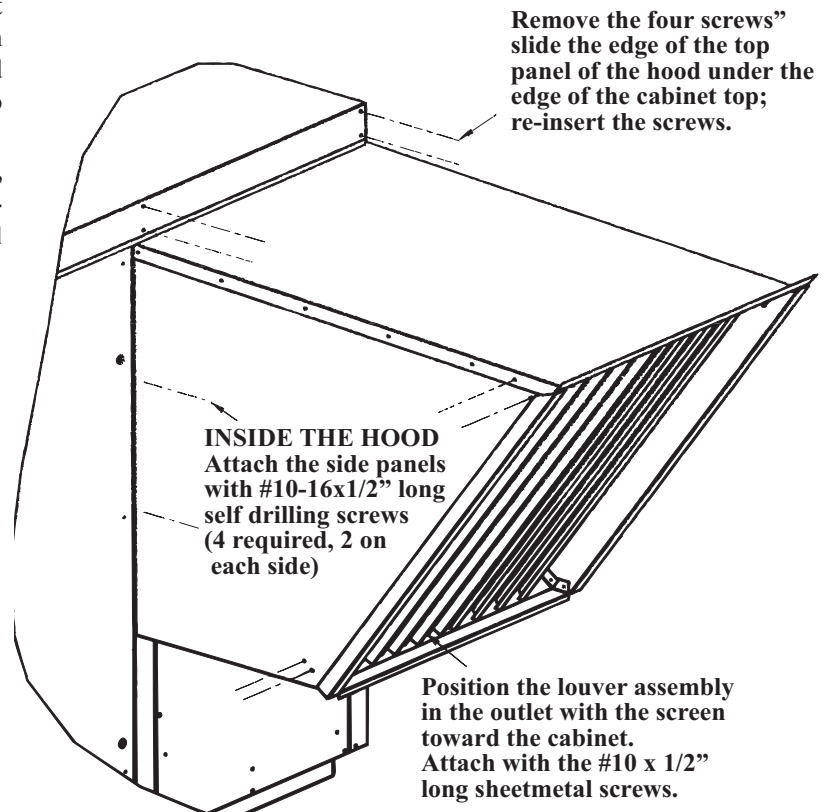
Refer to Figure 16. All screw ends should be inside.

To avoid possible damage, it is recommended that the outside air hood be installed after the system has been placed on the roof or slab. The air hood should be installed before the unit is operated. Do not install the hood while the unit is in operation.

**If the installation includes an optional pre-heater, install the pre-heater cabinet first. Then beginning with Step 2 below, install the outside air hood into the opening in the pre-heater cabinet.**

1. Remove the duct connector assembly that is factory-installed in the opening.
2. **Top Panel** -- Above the outside air inlet opening, remove the four factory-installed screws attaching the cabinet top. Slide the air hood top panel underneath the edge of the cabinet top. **The edge of the air hood top panel must be between the cabinet top and the cabinet end panel.** Reinsert the four sheet metal screws.
3. **Side Panels** -- Slide the air hood right side panel into the "slot" in the cabinet panel. Be sure that the edge of the side panel is underneath and to the inside of the hood top panel. Attach the side to the cabinet using two #10-16x1/2" long self-drilling screws. Attach to the hood top panel with sheet metal screws. Repeat with the left side panel.
4. **Bottom Panel** -- Position the air hood bottom panel so that it is to the **inside** of the two side panels. Attach to both side panels.
5. **Screen and Louver Assembly** -- With the intake screen toward the inside of the hood, position the pre-assembled vertical louver assembly in the inlet opening of the air hood. Using the remaining sheet metal screws, attach the louver assembly to the air hood side panels using the holes provided.

Figure 16 - Field Assemble and Install the Screened Outside Air Hood



### 16. Optional Vertical Supply and Return Air Kit (Option VK1)

With the installation of this optional kit, a unit that is ordered with horizontal supply and/or return air openings can be converted to provide vertical supply and/or return air openings. See the dimensions of the optional vertical openings in Figure 3, Paragraph 4. Complete illustrated instructions are included with the kit.

### 17. Optional Roof Curb (Option CJ1)

The 16" optional roof curb is shipped separately for field assembly and installation.

See the dimensions and instructions in Paragraph 7.

# Maintenance and Service

## 18. Maintenance Requirements

This unit will operate with a minimum of maintenance. To ensure long life and satisfactory performance, a unit that is operating under normal conditions should be inspected at least annually. If operating in an area where an unusual amount of dust or soot or other impurities are present in the air, more frequent inspection is recommended. When servicing, follow standard safety procedures as well as those specific instructions and warnings mentioned in this manual. After maintenance is complete and the unit is re-assembled, check for proper operation.

The following procedures should be carried out at least annually (see instructions below):

- Clean any external dirt and grease from the motors, blowers, and insides of the cabinet
- Check the filters. When dirty, replace with 2" pleated filters.
- Check all belts.
- Check the energy recovery wheel.
- If equipped with an optional pre-heater, check the elements, wiring and controls.
- Check the wiring for any damaged wire. Replace damaged wiring.

### • Motors

Clean the external surface of the motors. Check the electrical connections. Check that the motor is mounted securely. The motors do not require lubrication.

### • Belts and Drives

Check all three belts for wear. If blower belts are shiny (glazed), check and adjust belt tension. Replace worn, frayed, or badly glazed belts. If replacement is required, use the same type belt as was originally supplied. (Refer to Paragraph 9 or 12.)

### • Blowers

Check blowers; clean as needed. Do not lubricate bearings.

### • Filters

Check filters. Return air filter access door is left of the disconnect switch on the control side of the unit. Supply air filter access door is on the left side of the non-control side of the unit. Filters are disposable and must be replaced when dirty. Replace with 2" pleated filters. **Do not operate the unit without filters.**

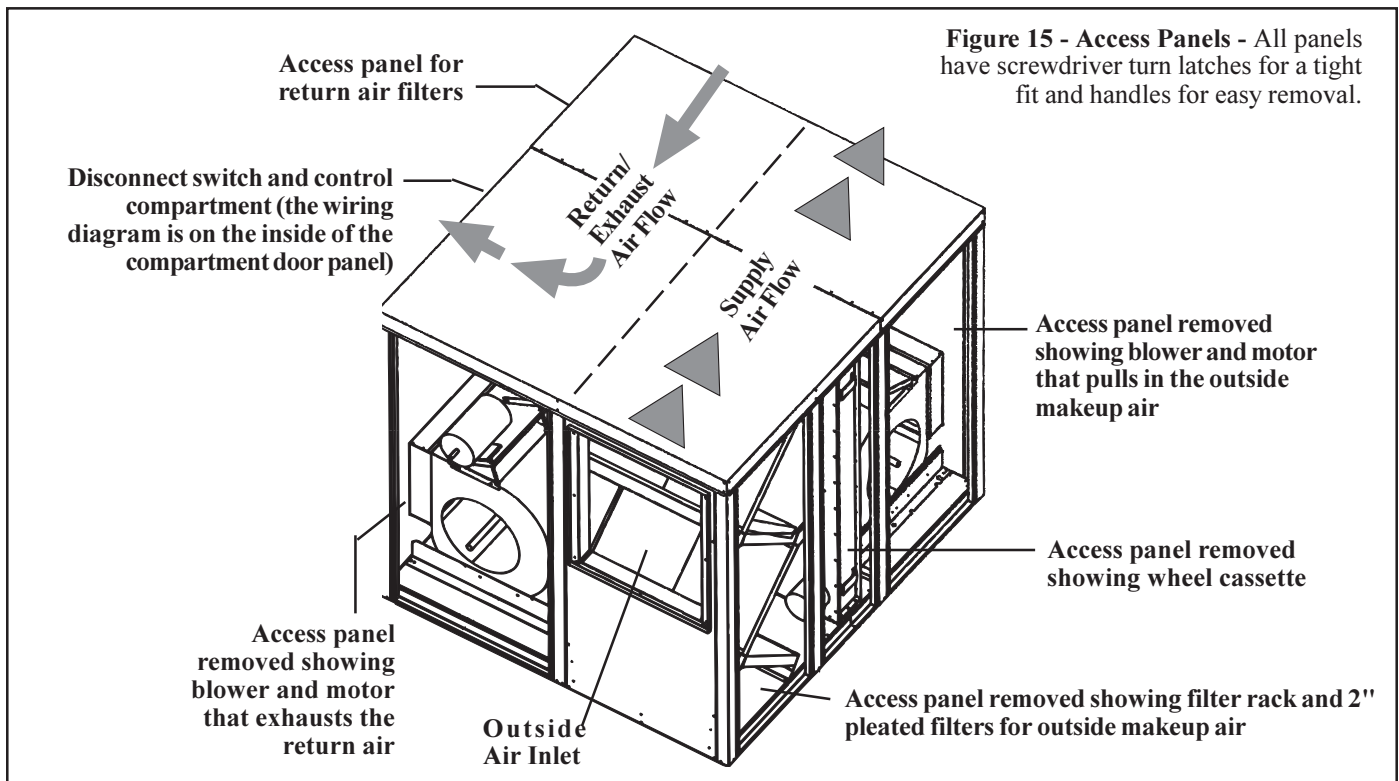
### • Energy Recovery Wheel

Check the energy wheel. The energy wheel cassette is accessible by removing the center panel on the non-control side of the unit.

- a) Unplug the motor.
- b) Remove the two 1/4 x 20 bolts (one on the top and one on the bottom).
- c) Slide the cassette out of the unit.

The wheel is considered "self-cleaning" and requires little maintenance. Discoloration and stains do not affect the wheel's function. If a buildup should occur, clean the wheel using 20 psig of clean dry air pressure and a vacuum. With a small nozzle, blow air through one face of the wheel while gently applying a shop vacuum to the opposite side to vacuum any debris exiting the wheel. Slowly work around the entire face of the wheel.

In the event that this method does not remove the visual buildup, the face of the wheel may be washed with clean water. However special precautions are required to ensure adequate drying of the wheel to prevent damage to the sensitive internal surfaces. Do not use solvents or any other cleaning fluids on the face of the wheel. Do not immerse the wheel in water or use excessive pressure.



# FOR SERVICE OR REPAIR, FOLLOW THESE STEPS IN ORDER:

**FIRST:**            **Contact the Installer**

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone \_\_\_\_\_

**SECOND:**        **Contact the nearest distributor** (See Yellow Pages). If no listing,  
contact Authorized Factory Representative, 1-800-695-1901 (Press 1).

**THIRD:**        **Contact** REZNOR®/ Thomas & Betts Corporation  
                         150 McKinley Avenue  
                         Mercer, PA 16137  
                         Phone: (724) 662-4400

Model No. \_\_\_\_\_

Unit Serial No. \_\_\_\_\_

Date of Installation \_\_\_\_\_

***Thomas & Betts***

---

---



©2001 Thomas & Betts Corporation, All rights reserved.        Printed in the U.S.A.

MANUFACTURER OF GAS, OIL, ELECTRIC HEATING AND VENTILATING SYSTEMS

**Trademark Note:** Reznor® is registered in the United States and other countries.

(800) 695-1901; [www.ReznorOnline.com](http://www.ReznorOnline.com)

9/01 Form 480 (Version B.1)