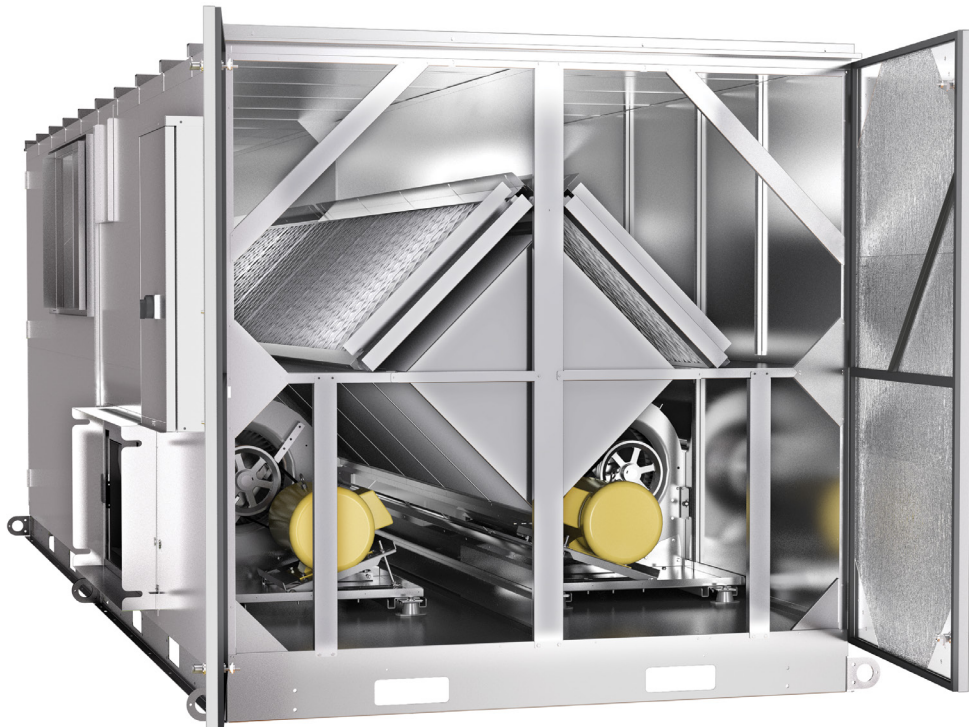


LE SERIES ERV

Installation, Operation and Maintenance Manual

LE10XIN



Model: LE10XINV shown
(also available with modules unassembled)

⚠ WARNING**ARC FLASH AND ELECTRIC SHOCK HAZARD**

Arc flash and electric shock hazard. Disconnect all electric power supplies, verify with a voltmeter that electric power is off and wear protective equipment per NFPA 70E before working within electric control enclosure. Failure to comply can cause serious injury or death.

Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable.

Before proceeding with installation, read all instructions, verifying that all the parts are included and check the nameplate to be sure the voltage matches available utility power.

The line side of the disconnect switch contains live high-voltage.

The only way to ensure that there is NO voltage inside the unit is to install and open a remote disconnect switch and verify that power is off with a volt meter. Refer to unit electrical schematic. Follow all local codes.

⚠ CAUTION**RISK OF DAMAGE TO ENTHALPIC CORES**

Whenever working within the ERV cabinet, protect the enthalpic cores from accidental damage. The core media is subject to damage from dropped tools or other foreign objects.

IMPORTANT

This equipment is to be installed by following Industry Best Practices and all applicable codes. Any damage to components, assemblies, subassemblies or the cabinet which is caused by improper installation practices will void the warranty.

IMPORTANT

Air ducts connecting this ERV to the Occupied Space must be installed in accordance with the Standards of the National Fire Protection Agency for the installation of Air-Conditioning and Ventilating Systems (Pamphlet No. 90A) and Warm-Air Heating and Air-Conditioning Systems (Pamphlet No. 90B).

⚠ CAUTION**RISK OF CONTACT WITH HIGH SPEED MOVING PARTS**

Disconnect all local and remote power supplies, verify with a voltmeter that electric power is off and all fan blades have stopped rotating before working on the unit.

Do not operate this unit with any cabinet panels removed.

⚠ CAUTION**RISK OF ELECTRIC SHOCK OR EQUIPMENT DAMAGE**

Whenever electrical wiring is connected, disconnected or changed, the power supply to the ERV and its controls must be disconnected. Lock and tag the disconnect switch or circuit breaker to prevent accidental reconnection of electric power.

⚠ CAUTION**RISK OF CONTACT WITH HOT SURFACES**

The blower motor and other electrical components are extremely hot during operation. Allow sufficient time for them to cool before working within the unit cabinet. Use extreme caution and wear protective gloves and arm protection when working on or near hot blower motors and electrical components.

IMPORTANT

This unit is intended for general ventilating and heating only. Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this equipment to range hoods, fume hoods or collection systems for toxics.

IMPORTANT

This unit is for ventilating finished structures only. It is not to be used until after all construction has been completed and construction debris and dust are cleaned from the Occupied Space.

1.0 OVERVIEW	7	5.5 WIRING SCHEMATICS	20
1.1 DESCRIPTION	7	5.6 CONTROL CONNECTIONS	21
1.2 FACTORY ASSEMBLY OF MODULES	7	5.7 MOTOR PROTECTION	22
1.3 MODELS.....	7	5.7.1 Units Equipped with Motor Starters.....	22
2.0 COMPONENT DESCRIPTION	8	5.7.2 Units With Variable Frequency Drives (VFDs).....	22
2.1 CABINET	8	5.8 EXTERNAL CONTROL CONNECTIONS	23
2.2 ENTHALPIC CORES	8	5.8.1 Single 2-Wire Control, Unpowered	23
2.3 FAN/MOTOR ASSEMBLIES.....	8	5.8.2 Single 2-Wire Control, Separate Power.....	23
2.4 E-BOX	8	5.8.3 Control Sending 24VAC “ON” Signal.....	23
2.5 FILTERS	9	5.8.4 External Control Using ERV Power Supply.....	24
2.6 FACTORY INSTALLED OPTIONS.....	9	5.8.5 Control with 2 Non-Powered Relay Contacts	24
3.0 SHIPPING/RECEIVING/HANDLING	10	5.8.6 Control with 2 “ON” Signals, External Power	25
3.1 UNIT WEIGHTS AND DIMENSIONS	10	5.9 QUICK-START FOR TESTING CORRECT	
3.1.1 Unit Weight	10	3PH WIRING	25
3.1.2 Shipping Dimensions and Weight.....	10	6.0 UNIT OPERATION	25
3.2 RIGGING AND CENTER OF GRAVITY	11	6.1 PRINCIPLE OF OPERATION	25
3.2.1 LE10XINH Hoisting Weights and COG.....	11	6.2 PRE-STARTUP	25
3.2.2 LE10XINV Hoisting Weights and COG.....	11	6.2.1 Verify Voltages.....	25
3.3 RECEIVING	12	6.2.2 Verify Transformer Wiring	25
3.4 RIGGING.....	12	6.2.3 Inspect Filters	25
3.5 HANDLING AND STORAGE	12	6.2.4 Inspect Foam Gasketing.....	26
4.0 UNIT PLACEMENT	13	6.2.5 Inspect Motor Vibration Isolators.....	26
4.1 BEFORE YOU BEGIN	13	6.2.6 Inspect Belts and Verify Sheave Alignment	26
4.1.1 Assembly of Modules.....	13	6.2.7 Inspect Fans.....	26
4.2 SERVICE CLEARANCES	14	6.2.8 Inspect and Clean the Cabinet Interior.....	26
4.3 SOUND ATTENUATION.....	15	6.2.9 Inspect Ductwork Connections.....	26
4.3.1 Outside the Building.....	15	6.3 UNIT STARTUP	26
4.3.2 Ducts	15	6.3.1 Fixed-Speed Units.....	26
4.3.3 Radiated Noise	15	6.4 BALANCING AIRFLOWS	27
5.0 INSTALLATION	16	6.4.1 All Fixed-Speed Units.....	27
5.1 DUCT CONNECTIONS	16	6.4.2 LE10X Filter Pressure Drop	28
5.1.1 Ducts to the Outside.....	16	6.4.3 Sheave Adjustment.....	29
5.1.2 Inside Ductwork System.....	16	6.4.4 Variable-Speed Units	29
5.2 FLOOR INSTALLATION—INDOOR UNITS.....	16	6.5 NORMAL OPERATION	29
5.3 OPTIONAL SPRING ISOLATOR ADJUSTMENT	16	6.6 EXTREME COLD OPERATION	29
5.4 ELECTRICAL REQUIREMENTS	17	7.0 UNIT MAINTENANCE	30
5.4.1 Factory-Recommended Electric Service Entry	17	7.1 MAINTENANCE 24 HRS. AFTER START-UP	30
5.4.1 Low Voltage Control System.....	18	7.2 MAINTENANCE 30 DAYS AFTER START-UP.....	30
5.4.2 How to Reset the 24VAC Circuit Breaker.....	18	7.3 MAINTENANCE SCHEDULE.....	30
5.4.3 Limits of Power Output	19	7.4 FILTERS	30
		7.5 FAN MOTORS	31
		7.5.1 Belt Tension	31
		7.5.1 Sheave Condition	31
		7.5.2 Motor Cleanliness	31
		7.5.4 Motor Lubrication	31
		7.6 PILLOW BLOCKS	32

7.7 ENTHALPIC CORES32
 7.7.1 Enthalpic Core Maintenance.....32
 7.7.2 Enthalpic Core Removal.....33
 7.7.3 Enthalpic Core Replacement.....33
7.8 PLENUM DIVIDERS33
7.9 FAN/MOTOR REMOVAL.....34
7.10 FILTER REPLACEMENT PRACTICES.....34
7.11 DOOR LATCH ADJUSTMENT35
7.12 SHEAVE ADJUSTMENT.....36
7.13 MAINTENANCE RECORDS37
7.14 SERVICE PARTS.....38
8.0 TROUBLESHOOTING 39
9.0 FACTORY ASSISTANCE 39

TABLE OF ILLUSTRATIONS

Figure 1.2.0 Airflow Orientations..... 7
 Figure 2.4.0 E-Box With Motor Starters..... 8
 Figure 3.2.0 LE86INH Weights and COG..... 11
 Figure 3.2.1 LE86INV Weights and COG..... 11
 Figure 4.2.0 LE10XINH Service Clearance..... 14
 Figure 4.2.1 LE10XINV Service Clearance..... 14
 Figure 5.3.0 Typical Spring-Type Vibration Isolator..... 16
 Figure 5.4.0 E-Box Wiring Entry Points..... 18
 Figure 5.5.0 Generic Single Phase Wiring Schematic, Standard..... 20
 Figure 5.5.1 Generic Three Phase Wiring Schematic, Standard..... 21
 Figure 5.8.0 Single 2-Wire Control, Unpowered..... 23
 Figure 5.8.1 24VAC From External Source..... 23
 Figure 5.8.2 External Control Using ERV 24VAC..... 24
 Figure 5.8.3 Control with 2 Non-Powered Relay Contacts..... 24
 Figure 5.8.4 Control with 2 “ON” Signals, External Power..... 25
 Figure 6.4.1 Clean Filter Pressure Drop Table (in. w.g.)..... 28
 Figure 6.4.0 Pressure Port Locations (typ)..... 28
 Figure 7.8.0 Plenum Divider Panels..... 33
 Figure 7.9.0 Fan and Motor Sled..... 34
 Figure 7.10.0 Filter replacement Tool Options..... 34
 Figure 7.13.0 Table of Sheave Adjustments..... 36
 Figure 7.12.1 Two-Belt Adjustable Sheave (typ)..... 36
 Figure 7.15.0 LE10XINH and LE10XINV Service Parts..... 38

1.0 OVERVIEW

1.1 DESCRIPTION

The LE10XIN ERV is a total enthalpy energy recovery ventilator. It recovers both sensible and latent energy from a building Exhaust Airstream and transfers that energy into a fresh Outdoor Airstream, which it then introduces into the building Supply Air. The result is a constant supply of fresh outdoor air in the Occupied Space with very little energy loss, enhancing Indoor Air Quality (IAQ). Each ERV has enthalpic cores through which both the EA and SA airstreams pass and each airstream has its own fan motor/blower. Each ERV has a high voltage control panel and a separate low voltage terminal strip for connection to user-specified control devices.

Fan speeds can be either single speed, using adjustable sheaves to change fan speed, or they can be variable speed, controlled by VFDs, a RenewAire Commercial Controller or by a BMS. There are a number of different control devices available to control the operation or speed of the unit fans. For further information on available control accessories, see the HE RenewAire catalog.

NOTE: This unit is an Energy Recovery Ventilator. It is commonly referred to throughout this manual as an "ERV".

IMPORTANT

It is important to understand and use the equipment airstream terminology as it is used in this manual. The airstreams are defined as:

- OUTSIDE AIR (OA): Air taken from the external atmosphere and, therefore, not previously circulated through the system.
- SUPPLY AIR (SA): Air that is downstream of the enthalpic cores and is ready for conditioning or for return to the Occupied Space.
- RETURN AIR (RA): Air that is returned to the ERV from a conditioned space.
- EXHAUST AIR (EA): Air that is removed from a heating or cooling appliance or from the Occupied Space and discharged.

1.2 FACTORY ASSEMBLY OF MODULES

The LE10XIN ERV is built as two modules that are to be assembled in the field. The customer may optionally order the modules to be assembled into one unit in the factory. See Digit 23 of the Configuration Code.

1.3 MODELS

The LE10XIN is offered in two different models, the LE10XINH and the LE10XINV. The LE10XINH and the LE10XINV are both for indoor installations and differ from each other in the location of the airstream ducting. Each of the indoor models has an optional alternate duct connection. See below.

NOTE: There is also a rooftop version of this ERV, known as the LE10XRT. It has a separate manual.

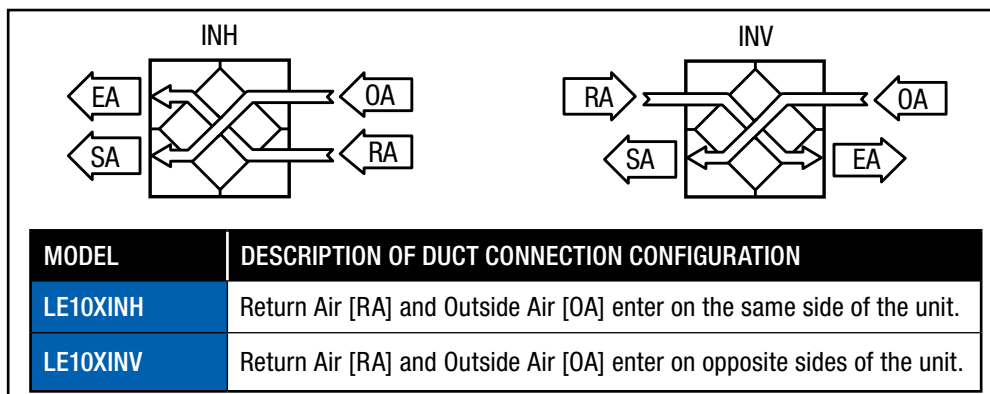


FIGURE 1.2.0 AIRFLOW ORIENTATIONS

2.0 COMPONENT DESCRIPTION

2.1 CABINET

The cabinet for the LE10XINH is made of 20 gauge galvanized steel and has 1" thick high-density, foil-backed insulation on the inside. Units are available in either single-wall or double-wall construction. Doors are hinged and are fitted with stainless steel machine screws through the faces to prevent accidental opening of the doors when the unit is in operation. Doors may be completely removed by removing the hinge pins. All units are equipped with adjustable-height leveling legs for purposes of leveling the unit. Duct flanges are provided at all four airstream openings for connection of field-supplied ductwork.

⚠ CAUTION

Low airflow can cause fouling of the enthalpic cores. The ERV must never be operated without clean filters in place and minimum airflow must be greater than 250 CFM per full-sized core.

2.2 ENTHALPIC CORES

All LE10XIN ERVs use ten static-plate enthalpic cores. The enthalpic cores transfer both latent and sensible energies between the airstreams. Cores are bi-directional and may be rotated in their mounting hardware, but care must be taken to install the correct side of the core toward the unit door. Gasketing is pre-installed on the cores and must be positioned to provide a proper air seal. For information on annual maintenance of the cores, see Section 7.0 Maintenance in this manual.

2.3 FAN/MOTOR ASSEMBLIES

There are two fan and motor assemblies in each ERV. The fans are belt-driven. All fans have an adjustable sheave on the electric motor for purposes of adjusting the fan speed. The motors require periodic inspection and lubrication. For information on adjusting sheaves, see Section 7.0 Maintenance.

2.4 E-BOX

Every LE10XIN is equipped with what is known as an "E-Box." High-voltage supply wiring and low-voltage control wiring is all terminated here. When VFDs are installed in the unit, the VFD keypads are installed here. If optional integrated programmable controls are installed, an additional 24 VAC transformer is installed here to power both the controller and its dedicated sensors.

NOTE: Every ERV has an attached electrical connection box, known as the E-Box. It is attached to the outside of the ERV and all electrical connections are made there. There is a high-voltage side and a low-voltage side. See Figure 2.4.0.

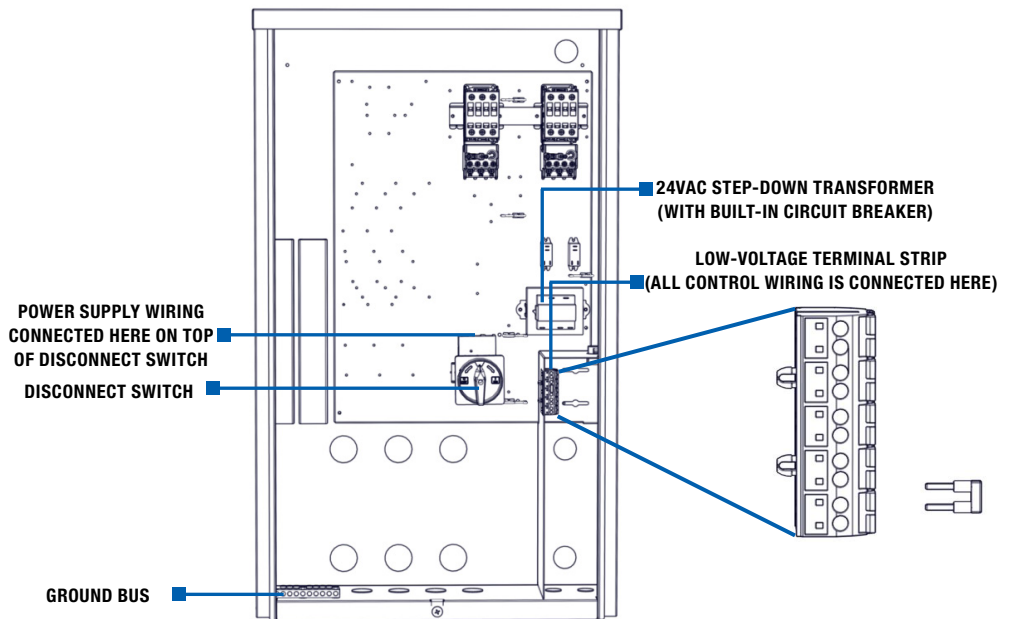


FIGURE 2.4.0 E-BOX WITH MOTOR STARTERS

2.5 FILTERS

All LE10XIN units come equipped with twenty MERV 8 20" x 25" x 2" (nominal) pleated filters. Filter holders can be adjusted to hold twenty MERV 8 20" x 25" x 4" (nominal) pleated filters which can be ordered as an accessory and are shipped loose.

MERV 13 filters can also be ordered as an accessory and are shipped loose.

- (20) 20" x 25" x 2" (nominal) pleated filters. Actual size: 19.5" x 24.5" x 1.75"
- (20) 20" x 25" x 4" (nominal) pleated filters. Actual size: 19.5" x 24.5" x 3.75"
- Minimum recommended effectiveness: MERV 6.

2.6 FACTORY INSTALLED OPTIONS

All LE10XIN units can be ordered with factory installed options. See Unit Configuration Code on page 6.

Options will have supplemental manuals shipped with the unit.

For Isolation Dampers, see *Isolation Dampers Supplemental Manual*.

For Commercial Controls, see *Commercial Controls Supplemental Manual*.

For Filter Alarm, see *Filter Alarm Supplemental Manual*.

For Variable Frequency Drive, see *VFD Supplemental Manual*.

3.0 SHIPPING/RECEIVING/HANDLING

LE10X units are palletized at the factory and then shipped by common carrier. Upon receipt by the installer, the shipment should be inspected for shipping damage, prior to unloading. Any discovered shipping damage should be immediately reported to the RenewAire sales rep and the damage must be recorded on the Bill Of Lading, prior to signing for acceptance of the shipment. The unit can be handled with a fork lift or a crane. Prior to moving the unit, verify that all latches and securing bolts on the cabinet doors are tightly fastened.

If a crane is used for moving the LE10X unit, unscrew the sheet metal plates that hold the unit to the pallet. Use two hoisting slings and a spreader bar to hoist the unit. The hoisting slings must be positioned around the ends of the unit so they do not touch the unit doors. Unit hoisting weights and Center of Gravity are detailed in Sections 3.1 and 3.2 in this manual.

Perform a test lift to make sure the unit is being hoisted level and is secure.

Place the LE10X unit on a flat surface where it will be protected from the weather and incidental damage. Do not remove protective coverings from any duct openings and keep the doors secured and tightly closed.

RenewAire also provides a manual for shipping, rigging, lifting and assembly of LE units that is available online at www.renewaire.com.

⚠ CAUTION

RISK OF DAMAGE TO ERV CABINET

Whenever the ERV is rigged for hoisting, ALL LIFTING LUGS must be used. If the ERV modules have already been joined, all eight lifting lugs must be used to avoid wracking or twisting the cabinet. See the shipping, rigging, lifting and assembly manual for detailed information.

3.1 UNIT WEIGHTS AND DIMENSIONS

3.1.1 Unit Weight

LE10XINH: Modular (per module) 1,423–1,912 lbs., varies by option(s)
Assembled (1-piece) 2,858–3,799 lbs., varies by option(s)

LE10XINV: Modular (per module) 1,127–2,222lbs., varies by option(s)
Assembled (1-piece) 2,858–3,788 lbs. varies by option(s)

3.1.2 Shipping Dimensions and Weight

LE10XINH: Modular (2-modules) 120" L x 90" W x 78" H
Module 1: 2,132lbs.,
Module 2: 2,107 lbs.

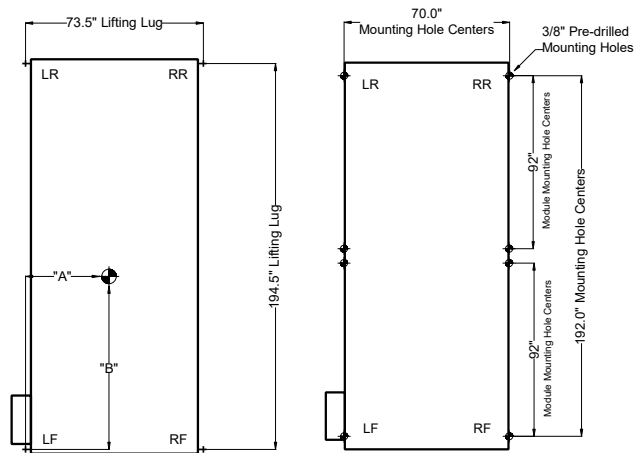
Assembled (1-piece) 240" L x 90" W x 78" H;
4,239 lbs

LE10XINV: Modular (2-modules) 120" L x 90" W x 78" H
Module 1: 2,442 lbs.,
Module 2: 1,792 lbs.

Assembled (1-piece) 240" L x 90" W x 78" H;
4,228 lbs.

3.2 RIGGING AND CENTER OF GRAVITY

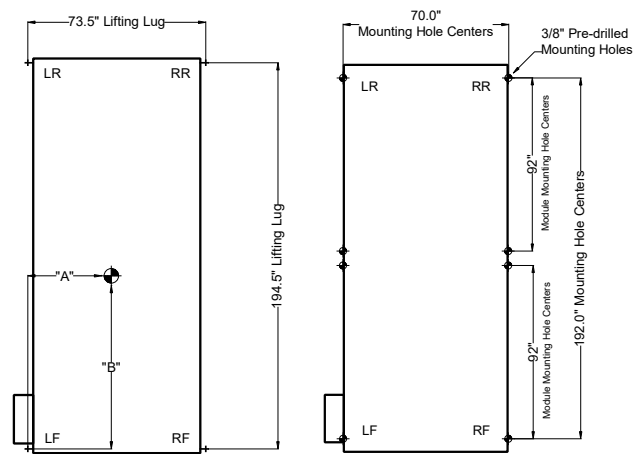
3.2.1 LE10XINH Hoisting Weights and COG



BASIC UNIT WEIGHTS (lbs.)					
Motors	UNIT	LF	LR	RR	RF
3 HP	2859	837	827	594	601
5 HP	2872	842	832	595	603
7.5 HP	2991	888	877	609	617
10 HP	3028	902	891	614	621
ADDITIONAL WEIGHTS FOR OPTIONS (lbs.)					
Options	UNIT	LF	LR	RR	RF
Double Wall	627	156	159	158	154
VFDs	12	10	1	0	1
RA or EA Damper	66	3	1	20	42
OA or FA Damper	66	1	3	0	1
Total Selected Weights					
Add the additional weights for options to the Basic Unit weights determined by motor size to determine Unit and Corner weights for a specific unit.					
Center of gravity: A=32" B= 101" (+/- 2")					

FIGURE 3.2.0 LE86INH WEIGHTS AND COG

3.2.2 LE10XINV Hoisting Weights and COG



BASIC UNIT WEIGHTS (lbs.)					
Motors	UNIT	LF	LR	RR	RF
3 HP	2859	819	665	616	759
5 HP	2873	825	666	617	765
7.5 HP	2990	874	676	628	812
10 HP	3028	889	679	632	828
ADDITIONAL WEIGHTS FOR OPTIONS (lbs.)					
Options	UNIT	LF	LR	RR	RF
Double Wall	616	153	155	155	153
VFDs	12	10	1	0	1
RA or EA Damper	66	20	42	3	1
OA or FA Damper	66	1	3	42	20
Total Selected Weights					
Add the additional weights for options to the Basic Unit weights determined by motor size to determine Unit and Corner weights for a specific unit.					
Center of gravity: A=32" B= 96" (+/- 2")					

FIGURE 3.2.1 LE86INV WEIGHTS AND COG

3.3 RECEIVING

Upon receipt of the LE10XIN, inspect the unit for obvious external damage. If damage is observed, take digital pictures and report the damage to your RenewAire rep. Note the damage on the carrier's Bill of Lading. Depending on expected transport and storage conditions, the unit may have only the duct openings covered, it may be stretch-wrapped or it may be crated. Do not unwrap the unit at this time. The unit will normally be moved to its final location while still wrapped and attached to its pallet.

The preferred method of hoisting the LE10X from the carrier truck is by using a construction forklift.

For rigging instructions, refer to the LE manual for shipping, rigging, lifting, and assembly that is also available online at www.renewaire.com.

Once the unit is unwrapped, prevent dirt and debris from entering the cabinet by covering any duct openings that do not have attached dampers. Keep the duct openings covered until it's time to connect ductwork.

3.4 RIGGING

For rigging instructions, refer to the LE manual for shipping, rigging, lifting and assembly that is also available online at www.renewaire.com.

3.5 HANDLING AND STORAGE

Units that must be stored prior to installation should be left on their pallets and protected from weather and physical damage. Units must be placed on a level surface to prevent wracking of the pallet and the LE10XIN. All access doors must be secured with all available hardware (door latches and securing bolts) and all openings into the cabinet must be sealed to prevent entry of dust, dirt and debris.

4.0 UNIT PLACEMENT

4.1 BEFORE YOU BEGIN

Units that must be stored prior to installation should be left on their pallets and protected from weather and physical damage. Units must be placed on a level surface to prevent wracking of the pallet and the LE10X. All access doors must be secured with all available hardware (door latches and securing bolts) and all openings into the cabinet must be sealed to prevent entry of dust, dirt and debris.

The LE10XIN is designed for installation in a sheltered location, out of the weather. The preferred mounting location is to place the unit on a concrete floor.

Select a location that is central to the inside duct runs and close to both the exhaust duct (to the outside) and also to the Supply air duct (from the outside).

The exhaust outlet and the outside air inlet on the outside of the building should be at least 10' apart to avoid cross-contamination. Comply with all local building codes in the positioning of the duct openings. Do not position the exhaust air outlet in a location where it will dump exhaust air into any enclosed or occupied space. The duct inlets and outlets should be screened against insects and vermin and should be shielded from the weather to prevent entry of rain or snow.

For all installations, maintain needed service clearances as shown on the dimensioned drawings located in Section 4.2 of this manual.

NOTICE

This ERV must be installed in compliance with SMACNA guidelines and all applicable local building codes.

4.1.1 Assembly of Modules

Many ERVs are ordered pre-assembled at the factory. For those units that are to be assembled in the field, follow the assembly instructions found in the accompanying LE Models: Shipping, Rigging, Lifting, Assembly manual, to be found in the documentation package shipped with each unit and available online at www.renewaire.com.

4.2 SERVICE CLEARANCES

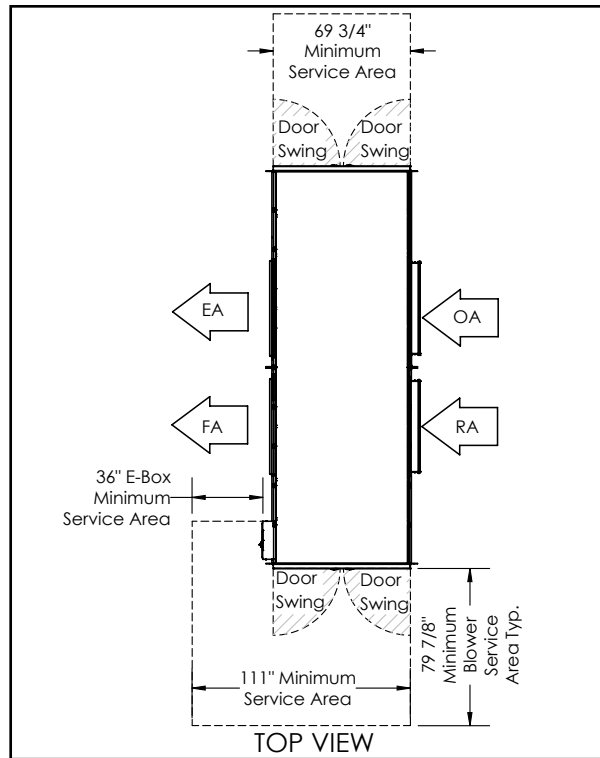


FIGURE 4.2.0 LE10XINH SERVICE CLEARANCE

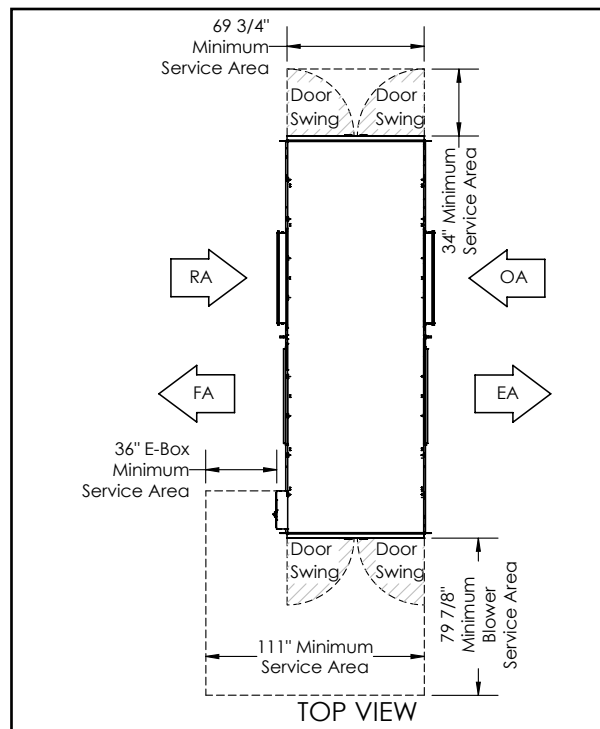


FIGURE 4.2.1 LE10XINV SERVICE CLEARANCE

4.3 SOUND ATTENUATION

Take these simple steps to attenuate noise from the unit.

4.3.1 Outside the Building

Exhaust velocity noise is the primary cause of unit-related noise outside the building. Size the exhaust duct and grille for less than 1000 FPM air velocity. When practical, orient the exhaust air hood to point away from houses or public areas.

4.3.2 Ducts

Make sure the ductwork at the unit outlets is stiff enough to resist the flexure and resulting booming associated with system start-up and shut-off, as well as the turbulent flow conditions at the blower outlets.

In general, provide smooth transitions from the ERV's outlets to the duct. The ducts connecting to the outlets should be straight for a sufficient distance, with gradual transitions to the final duct size.

These guidelines are consistent with SMACNA recommended duct layout practices for efficient and quiet air movement. Follow SMACNA guidelines.

4.3.3 Radiated Noise

The LE10X is insulated with high-density fiberglass. This provides significant attenuation of radiated sound.

The outlet ducts can be significant sources of radiated sound as well. The SA and EA ducts (outlet ducts) should be insulated for sound control. This insulation should start at the unit. At a minimum the first ten feet of duct should be insulated. All parts of the SA and EA ducts located in the mechanical space should be insulated for sound control, both to minimize sound radiation out of these ducts and also to control sound radiation into the ducts.

NOTE: Ducts inside a building that are connected to the outside must be insulated with a sealed vapor barrier on both the inside and the outside of the insulation.

NOTE: It is the installer's responsibility to select appropriate materials capable of safely supporting the weight of the ERV and all attached hardware, such as ductwork. It is the installer's responsibility to determine the location of the ERV and the needed supporting threaded rods. All such installations must be reviewed and approved by an engineer.

5.0 INSTALLATION

5.1 DUCT CONNECTIONS

All duct connections to the sides of the unit are equipped with double-flanged duct connections. These allow for connection of ductwork insulated on the inside or the outside, or for installation of lined ducts.

If the unit has factory-installed dampers on the sides of the unit, no duct flanges are provided at the dampers. Ducts can be attached directly to the dampers.

5.1.1 Ducts to the Outside

The exhaust outlet and Supply air inlet on the outside of the building should be at least 10' apart to avoid cross-contamination. The exhaust outlet should not dump air into an enclosed space or any other structure. The inlets and outlets should be screened against insects and vermin and shielded from the weather to prevent the entry of rain or snow.

Ducts connecting the HE4XIN to the outside must be insulated, with sealed vapor barrier on both inside and outside of the insulation. Insulate both the Outside Air (OA) and Exhaust Air (EA) ducts.

5.1.2 Inside Ductwork System

Ensure Good Ductwork Design

Ductwork should be designed to allow the unit to provide the required airflow and reduce pressure drop for efficient, quiet operation. If the inside ducts run through unconditioned spaces they must be insulated with a sealed vapor barrier on both inside and outside of insulation.

5.2 FLOOR INSTALLATION—INDOOR UNITS

Most units are installed in a location specified by others. In general, it's preferable to install the unit on a flat, reasonably level surface, such as a concrete floor.

5.3 OPTIONAL SPRING ISOLATOR ADJUSTMENT

Neoprene vibration isolators come standard but can be upgraded to spring vibration isolators.

Spring-type vibration isolators can optionally be used in LE model ERVs. Depending on fan and motor size, either four or six isolators are installed on each motor and blower sled assembly. Two different isolator spring strengths may be used and they cannot be interchanged. Each isolator has a support disc that is threaded and will move up or down on the threaded bolt. The up or down movement determines the upward force on the sled. With age, the supporting springs may require adjustment by repositioning the support disc.

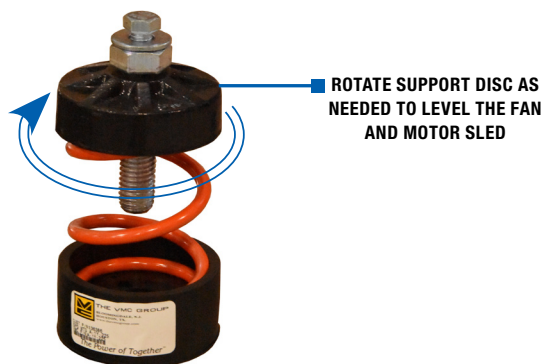


FIGURE 5.3.0 TYPICAL SPRING-TYPE VIBRATION ISOLATOR

5.4 ELECTRICAL REQUIREMENTS

Electrical Options and Ratings are identified on the Unit Label (located near electrical box). Find the complete Unit Model Number in the lower left corner of the Unit Label.

⚠ CAUTION

Before bringing power to the unit check unit nameplate to confirm it matches the voltage and phase of the power you are supplying. Remember that your field connections need to be accessible for inspection.

5.4.1 Factory-Recommended Electric Service Entry

Knockouts are provided in the bottom of the E-box for entry of high-voltage power supply wiring. Install the wiring in accordance with local codes and provide strain relief at the E-box opening. Wiring is then terminated on the top of the disconnect switch.

Low-voltage control wiring is to enter the E-box through the knockout in the bottom of the E-box. Provide strain relief as needed.

High-voltage supply wiring is to be connected on the top side of the disconnect switch. See Figure 5.4.0 below.

⚠ CAUTION

Do not remove or disable the wiring interconnection between the Overload Relays and the Contactors. Without this inter-connection the motor(s) will not be protected against overload.

⚠ WARNING

ARC FLASH AND ELECTRIC SHOCK HAZARD

Arc flash and electric shock hazard. Disconnect all electric power supplies, verify with a voltmeter that electric power is off and wear protective equipment per NFPA 70E before working within electric control enclosure. Failure to comply can cause serious injury or death.

Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable.

Before proceeding with installation, read all instructions, verifying that all the parts are included and check the nameplate to be sure the voltage matches available utility power.

The line side of the disconnect switch contains live high-voltage.

The only way to ensure that there is NO voltage inside the unit is to install and open a remote disconnect switch and verify that power is off with a volt meter. Refer to unit electrical schematic. Follow all local codes.

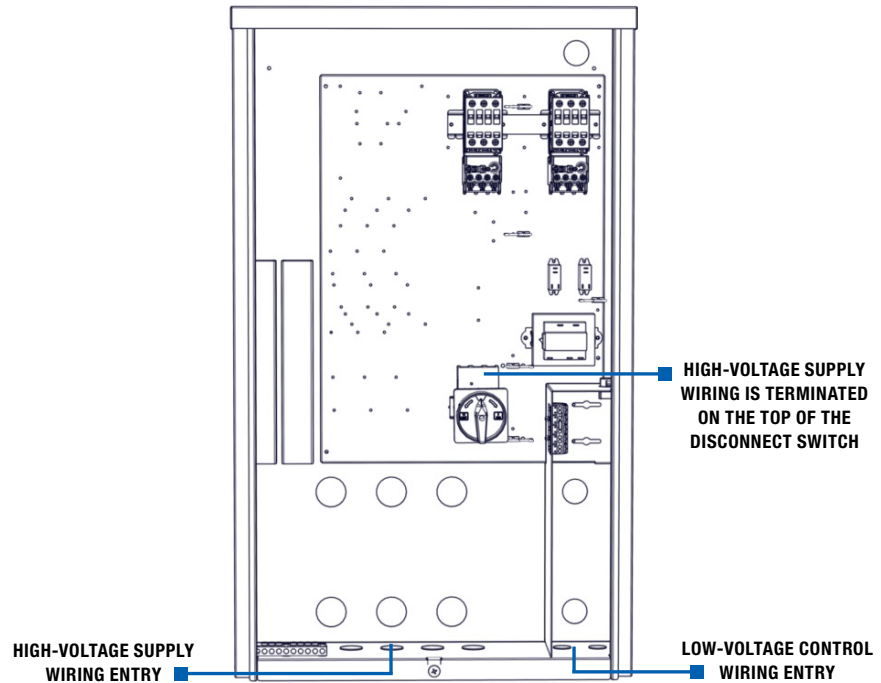


FIGURE 5.4.0 E-BOX WIRING ENTRY POINTS

NOTICE

If primary-side voltage is 230VAC, move black primary-side lead from transformer's "208V" terminal to the transformer's terminal marked "240V" ("230V" in some units). Do not move the black primary-side lead that is connected to the transformer's "COM" terminal.

5.4.1 Low Voltage Control System

This ERV is provided with a Class II 24VAC power supply system that operates the unit's contactor(s) for HE6X/7X/8X. The ERV's 24VAC Power Supply can also be used to power the externally-installed controls system: up to 8VA of power is available.

The unit's power supply system includes isolation relay(s) so you can use external controls whose contact ratings are as low as 50mA (1.2VA). Also, it is possible to operate the isolation relays with 24VAC power from an external source (with proper wiring connections).

A built-in circuit-breaker prevents damage to the transformer and other low-voltage components in the event of a short-circuit or overload. In extreme cases, the transformer itself is designed to fail safely.

Specifications:

- Nominal Output Voltage under load: 24VAC
- Typical Output Voltage at no load: 29–31V
- Minimum contact rating for connected control device: 50 mA (1.2VA)
- Circuit Breaker Trip Point: 3A

5.4.2 How to Reset the 24VAC Circuit Breaker

If the transformer is subjected to an excessive load or a short circuit, the circuit breaker will trip to prevent the failure of the transformer. When it trips the circuit breaker's button pops up. Shut off the primary-side power to the unit, and remove the excessive load or the short. The circuit breaker can be reset about fifteen seconds after it trips by pressing in the button.

⚠ CAUTION

1. Connect only to components intended for use with 24VAC power.
2. Do not undersize the low-voltage wires connected to this device. Observe the wire length and gauge limits indicated in this manual.
3. Do not overload this unit's 24VAC power supply system. Confirm that the power requirements of devices you connect to this power supply system do not exceed 8VA in total.
4. If an external source of 24VAC power is used to control the unit, consult the wiring schematics and connect the external power only to the specified terminals in order to avoid damaging the unit or external controls. Connect only CLASS II power to the control terminals of this unit.
5. Unit is not equipped to receive analog signals (such as 1–10 vdc or 4–20 mA).

⚠ CAUTION

Be careful if the external control system provides 24VAC power at its control output: make sure blue and red leads are separately capped and not connected to any other wires.

5.4.3 Limits of Power Output

If limits on wire gauge and length are observed, you may connect control devices that draw up to 8VA to the blue and red wires. More than one device can be connected as long as total steady-state load does not exceed 8VA.

Wire Gauge	#22	#20	#18	#16	#14	#12
Circuit Length	100'	150'	250'	400'	700'	1000'

“Circuit Length” is distance from ERV to Control Device.

Observe these limits to wire length and gauge in order to ensure reliable operation of the control system.

5.5 WIRING SCHEMATICS

NOTE: This schematic is for reference only. The wiring schematic attached to the unit is as-built. Contact RenewAire Customer Service for wiring diagrams of specific configurations.

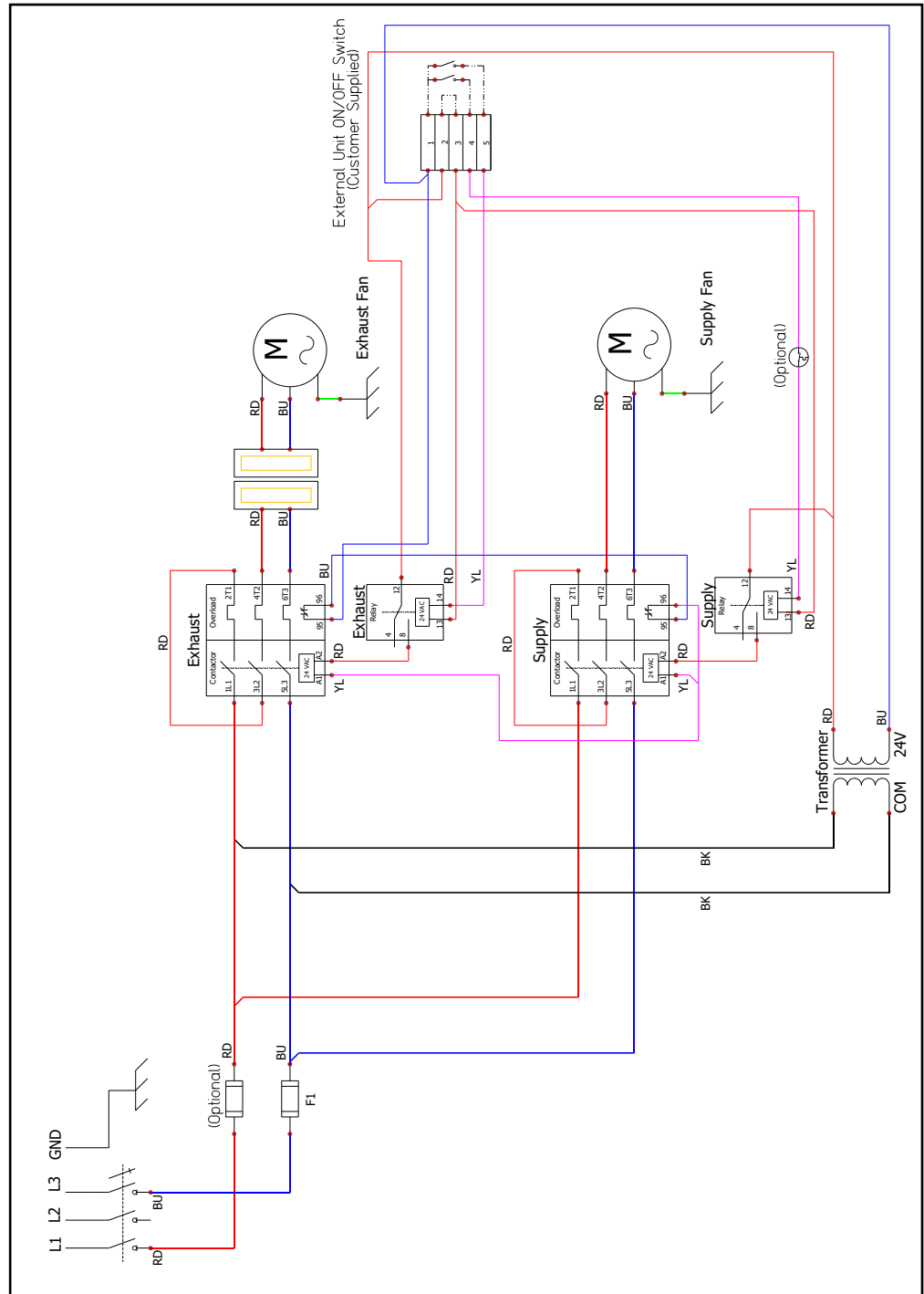


FIGURE 5.5.0 GENERIC SINGLE PHASE WIRING SCHEMATIC, STANDARD

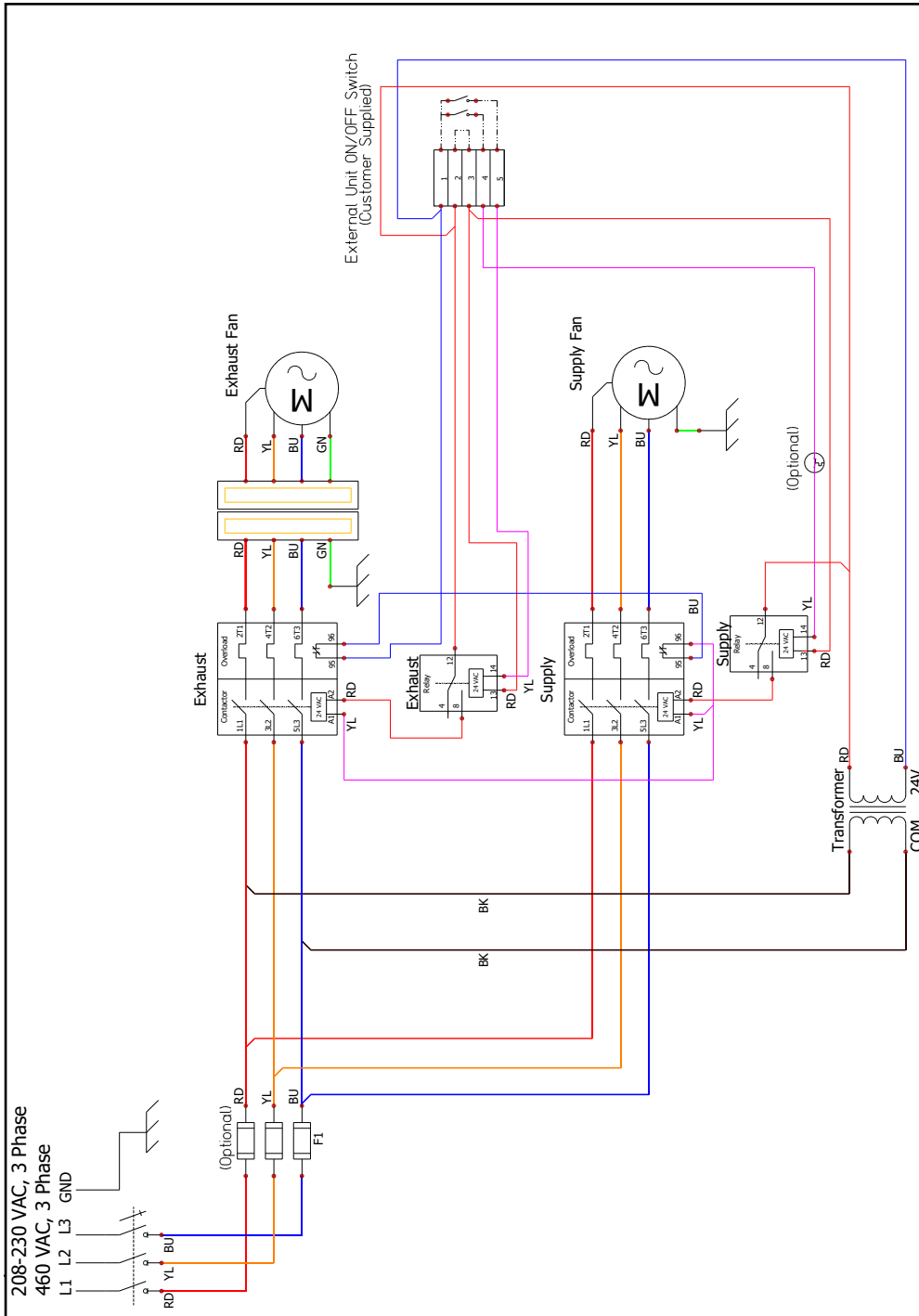



FIGURE 5.5.1 GENERIC THREE PHASE WIRING SCHEMATIC, STANDARD

5.6 CONTROL CONNECTIONS

Control wiring is to enter the E-Box through a knockout at the bottom of the E-Box and is then terminated on the low voltage terminal strip. See Section 5.4 Wiring Schematics for further information.

 NOTE: This schematic is for reference only. The wiring schematic attached to the unit is as-built. Contact RenewAire Customer Service for wiring diagrams of specific configurations.

⚠ CAUTION**UNITS WITH 230VAC POWER SOURCE:**

The ERV is shipped from the factory with the transformer set for 208VAC primary power. If the actual power source is 230VAC, move the black primary-side lead from the transformer's "208V" terminal to the transformer's "230V" terminal.

Connect only to components intended for use with a 24VAC power supply.

Do not interconnect the unit's Class II power supply with an external Class II power supply.

Do not use undersized low voltage wiring to connect this device. Observe the wire gauge/wire length chart on the previous page.

Do not overload the power supply. Verify that the combined load of all devices connected to the power supply do not exceed 8VA.

Any external 24VAC power supply connected to this device must be connected to the terminals as shown on the wiring schematics. Connect only Class II power to the terminals on this unit.

This unit is not designed to accept analog control signals unless the unit is equipped with Integrated Microprocessor controls and/or VFDs.

This unit is not designed to communicate directly with a Building Management System (BMS) such as BACnet unless the unit is equipped with microprocessor controls. The unit can be controlled by powered or non-powered contacts operated by any kind of control system.

Units that are equipped with VFDs or optional Integrated Microprocessor Controls can communicate directly with BACnet systems.

5.7 MOTOR PROTECTION**5.7.1 Units Equipped with Motor Starters**

Units that are not equipped with optional VFD drives are supplied with IEC-style motor starters to operate the motors and to protect the motors against overload. IEC-style motor starters use overload relays (see image on following page) to detect excessive current and interrupt the control circuit that engages the motor's contactors.

The overload relays are sized to Full Load Amp (FLA) rating of the protected motor and can be adjusted to trip the control circuit at a specific setting within a range. Overload relays should initially be set at the FLA rating of the controlled motor. See the unit rating label. If the overload relays trip at unit start-up, they can be adjusted to trip at no higher than 115% of the motor's FLA rating.

Terminals 96 and 97 on the overload relays and terminals 14 and 13 of the contactors are Normally Open (NO) dry contacts and may be used to signal that the contactors are closed and/or that the overload relays have tripped.

5.7.2 Units With Variable Frequency Drives (VFDs)

In units equipped with a VFD(s), motor overload protection is provided by the VFD. See separate documentation supplements.



NOTE: Units are factory-wired so that if one blower motor is shut down due to starter overload, the second motor will also be shut down.

5.8 EXTERNAL CONTROL CONNECTIONS

External control wiring is to be terminated on the low voltage terminal strip in the E-Box as shown in Section 5.4.1 of this manual.

5.8.1 Single 2-Wire Control, Unpowered

See Figure 5.8.0 if the control requires no power from the ERV and acts as a simple ON/OFF switch. The control must not supply any power to the ERV.

- Install jumper (provided) between terminals 2 and 3.
- Connect the control's contacts to terminals 1 and 4 to operate the isolation relays for OA/SA blower.
- Install jumper between terminals 4 and 5 to operate the ERV's isolation relays for the RA/EA blower.

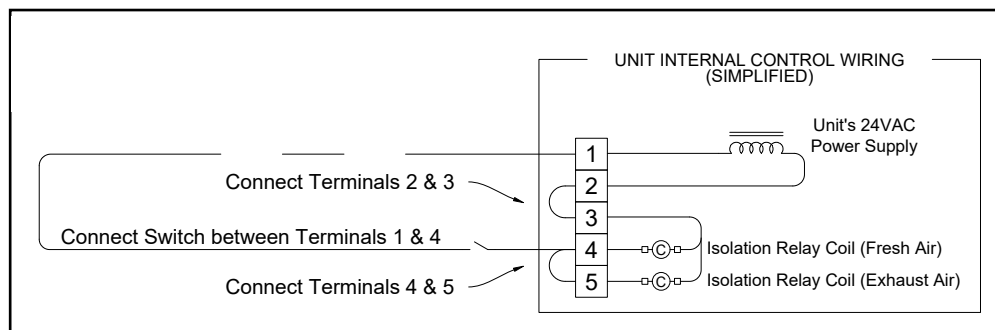


FIGURE 5.8.0 SINGLE 2-WIRE CONTROL, UNPOWERED

5.8.2 Single 2-Wire Control, Separate Power

Use the schematic shown in Section 5.7 if the control is on a separate power supply with no power present at control output.

5.8.3 Control Sending 24VAC "ON" Signal

See Figure 5.8.1 if a 24VAC "ON" signal is to be sent from an external power source to the ERV.

- Verify that a jumper is NOT installed between terminals 2 and 3.
- 24VAC can be safely applied to terminals 3 and 4 to operate the ERV's isolation relay for the OA/SA blower.
- Install a jumper (provided) between terminals 4 and 5 to operate the ERV's isolation relay for the RA/EA blower.
- Supply only 24VAC (not VDC) from a Class II power source.

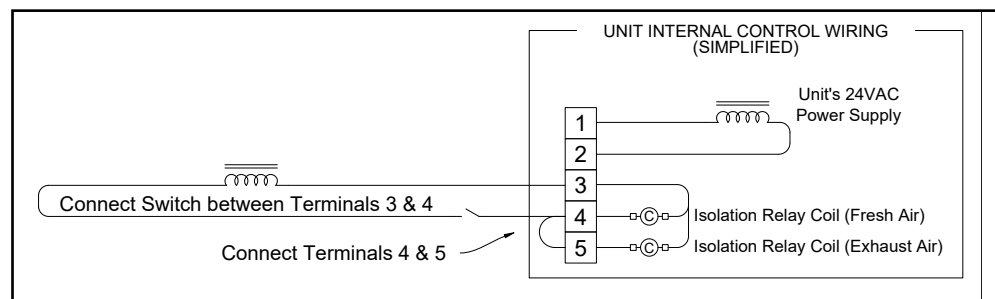


FIGURE 5.8.1 24VAC FROM EXTERNAL SOURCE

NOTE: The simplified schematics below show only the relevant portions of the low-voltage control circuit in the ERV unit and representational external control approaches. See the complete unit schematics above.

CAUTION
Make sure the control provides no voltage or current at its output terminals.

CAUTION
Supply only 24VAC (not VDC) from a Class II Power Source.

5.8.4 External Control Using ERV Power Supply

See Figure 5.8.2 if external control is to be applied using 24VAC from the ERV power supply.

- External control system must not draw more than 8VA.
- Install jumper (provided) between terminals 2 and 3.
- Connect the switched output of the control to terminal 4 to operate the ERV’s isolation relay for the OA/SA blower.
- Install jumper between terminals 4 and 5 to operate the ERV’s isolation relay for the RA/EA blower.

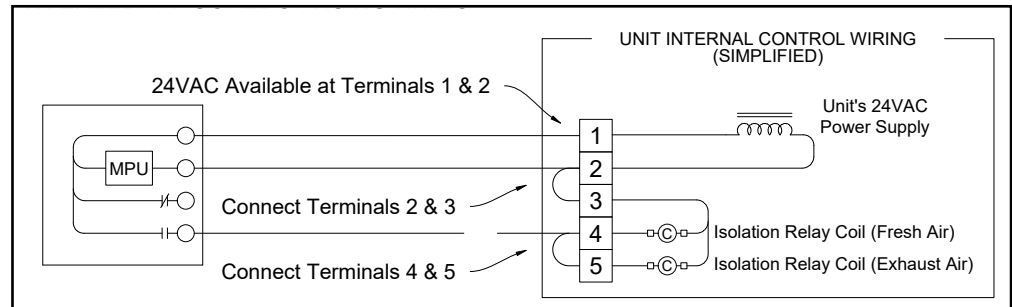


FIGURE 5.8.2 EXTERNAL CONTROL USING ERV 24VAC

5.8.5 Control with 2 Non-Powered Relay Contacts

See Figure 5.8.3 if the external control system provides no voltage or current at its output contacts.

- Install jumper between terminals 2 and 3.
- Connect one side of each of the output contacts to terminal 1.
- Connect the other side of the output contact to terminal 4 in order to control the SA blower.
- Connect the other side of the output contact to terminal 5 in order to control the EA blower.

CAUTION
External control system should not draw more than 8VA.

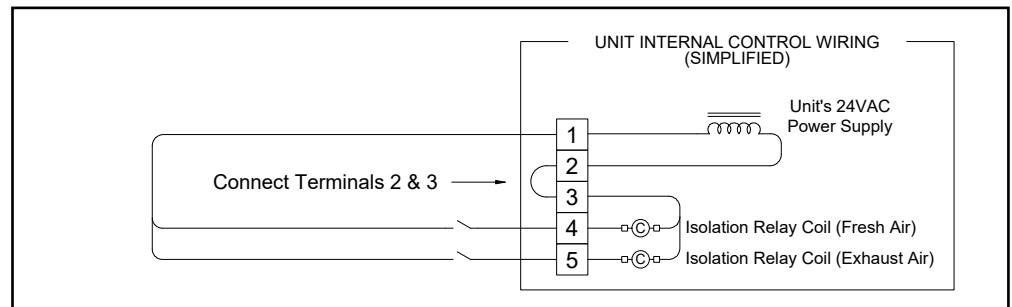


FIGURE 5.8.3 CONTROL WITH 2 NON-POWERED RELAY CONTACTS

5.8.6 Control with 2 “ON” Signals, External Power

See Figure 5.8.4 if the controller is sending two 24VAC “ON” signals from an external power source.

- Verify there is NO jumper between terminals 2 and 3.
- Apply one 24VAC signal to terminals 3 and 4 to operate the isolation relay for the SA blower.
- Apply the second 24VAC signal to terminals 3 and 5 to operate the isolation relay for the EA blower.
- Verify that the polarity of each wire connected to terminal 3 is the same.

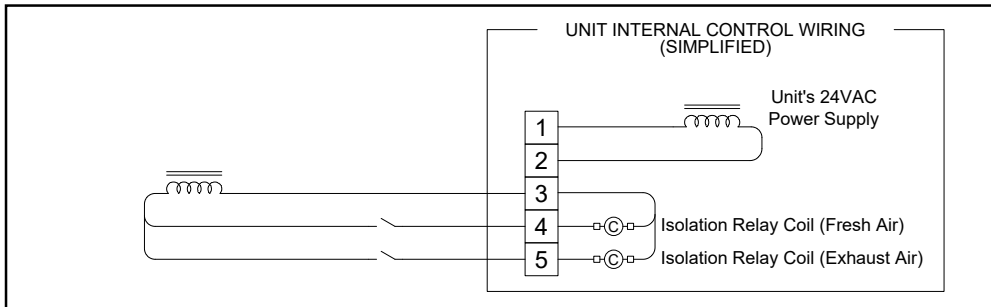


FIGURE 5.8.4 CONTROL WITH 2 “ON” SIGNALS, EXTERNAL POWER

⚠ CAUTION

Supply only 24VAC (not VDC) from a Class II Power Source.

5.9 QUICK-START FOR TESTING CORRECT 3PH WIRING

All units that run on 3 phase power should be test-run immediately after high voltage wiring connections are made. This will verify that the three phases are properly connected, that the dampers will open and close properly and the fans are working properly.

For purposes of testing correct phase connections, the internal 24VAC power supply will be used to power-up the fans and all external control devices will be disabled, when applicable.

6.0 UNIT OPERATION

6.1 PRINCIPLE OF OPERATION

The LE10X has one basic purpose: to exhaust air from a structure and bring in Supply air from outside, while transferring heating or cooling energy from the exhaust air to the Supply air.

The LE10X is a very simple device, and will accomplish this purpose as long as the blower is able to move air through the enthalpic core.

6.2 PRE-STARTUP

6.2.1 Verify Voltages

Using a voltmeter, test the input voltages as supplied to the disconnect switch. Refer to Digit 13 of the unit Configuration Code to find the rated voltage. The supplied voltage must be within +/- 10% of the rated voltage.

6.2.2 Verify Transformer Wiring

Units with 230VAC power source are shipped with the transformer wired for 208VAC. If the unit is receiving 230VAC, make sure the black primary-side wire on the transformer’s 208V terminal has been moved to the 230V terminal.

6.2.3 Inspect Filters

Filters must be installed prior to fan start-up. Filters must be clean and butted tightly against each other, allowing no air circulation around them.



NOTE: Any changes to unit low-voltage wiring should be made with the disconnect switch in the OFF position.



NOTE: When installing temporary jumpers on the low-voltage terminal strip, use 18 gauge or larger wire.

6.2.4 Inspect Foam Gasketing

Inspect the gasketing to make sure there are no gaps allowing air movement around the cores or filters.

6.2.5 Inspect Motor Vibration Isolators

The optional spring-type motor vibration isolators are adjustable in height. The height adjustment is for holding the fan assembly sled at a uniform height. Verify that the fan sled height is uniform at all the spring-loaded vibration isolators if they are present.

6.2.6 Inspect Belts and Verify Sheave Alignment

Prior to shipment from the factory, sheaves are carefully aligned and belts are tensioned. Inspect the motor mount to verify that it did not shift during shipment of the unit. Verify that belts are still properly tensioned and that they track correctly in the sheaves.

6.2.7 Inspect Fans

Prior to start-up, the fans should be rotated by hand to make sure that the impeller is not rubbing anywhere and that they turn freely.

6.2.8 Inspect and Clean the Cabinet Interior

During the construction and installation phases of a project, dust, dirt and debris will often accumulate inside a unit. Thoroughly clean the inside of the unit by vacuuming and/or wiping metal surfaces with a damp rag.

6.2.9 Inspect Ductwork Connections

Ducts attached to the ERV must be firmly attached, sealed and supported in accordance with installation instructions and SMACNA guidelines.

6.3 UNIT STARTUP

6.3.1 Fixed-Speed Units

Most fixed-speed units do not have any external controlling signals and only require turning on the disconnect switch, located on the E-Box. When the disconnect switch is turned "ON," any dampers will first move into their correct operating positions and then power is supplied to the motor contactors, causing the fans to run.

Some fixed-speed units are wired to receive an actuating signal from an external source. If there is an external actuating signal source, verify the type of signal and that it is wired according to the low-voltage wiring diagrams found in Section 5.7 of this manual. Turn on the disconnect switch and then turn "ON" the actuating device. After any dampers have moved into their correct positions, power is then applied to the motor contactors and the fans will begin running.

IMPORTANT

It is important to balance the airflows after the unit is operational and all ductwork has been installed. Balancing the airflows is typically required by state and/or local codes, and is often specified by the HVAC design engineer.

Optimum efficiency of the enthalpic cores is achieved when the airstreams are properly balanced.

6.4 BALANCING AIRFLOWS

During the construction and installation phases of a project, dust, dirt and debris will often accumulate inside a unit. Thoroughly clean the inside of the unit by vacuuming and/or wiping metal surfaces with a damp rag.

All HVAC installations are governed by local and state building codes, some of which include specific requirements for balancing of airflows. In addition, the HVAC design engineer typically includes a specification for balancing of airflows. If there is a conflict between the specification sources, consult the HVAC design engineer.

A frequent requirement is for the airstreams to be perfectly balanced between Supply Air supply and Exhaust Air discharge. In practice, it is generally preferable to leave a slight imbalance in the airflows, with the Exhaust Air set for slightly less than Supply Air intake, producing a slight positive pressure within the Occupied Space. The reason for doing this is to reduce air infiltration, which is untempered air. Having an imbalance in the airstreams results in slightly lower efficiency in the energy transfer in the enthalpic cores, but it is made up for by the reduction in air infiltration. **Whenever airstreams are adjusted for an imbalance, the imbalance should be no more than 5%.** Each job site is different and equipment requirements will vary. Example: there may be a water heater that is not ducted to the outside and therefore consumes and discharges large amounts of building air.

The process of balancing airflows is accomplished after all ductwork has been installed and examined for compliance to SMACNA guidelines. Improperly designed and installed ductwork will cause turbulence in the airstreams and restrictions in airflow, all of which will lower the operating efficiency of the HVAC system.

All airflow adjustments are dependent on taking accurate measurements of actual airflow by means of a manometer in the test ports on the unit. For some units, digital controls may have been installed that incorporate airflow sensors and it will not be necessary to take manometer readings. For further information on using the information from an integrated commercial controller, see the manual provided with the controller.

6.4.1 All Fixed-Speed Units

For all fixed-speed units, manometer readings are taken and then the adjustable sheaves on the motors are adjusted to re-set fan speeds.

Equipment Required

- A magnehelic gauge or other device capable of measuring 0–1.0 in. water of differential pressure.
- 2 pieces of natural rubber latex tubing, 1/8" ID, 1/16" Wall works the best.

The individual differential static pressures (DP) are measured using the installed pressure ports located in the front of the units core access doors.

Do not relocate pressure ports. Procedure:

- To read SCFM of Supply Air (SA) install the "high" pressure side (+) of your measuring device to the Outside Air (OA) port and the "low" pressure side (-) to the Supply Air (SA) port.
- To read SCFM of Return Air (RA) install the "high" pressure side (+) of your measuring device to the Return Air (RA) port and the "low" pressure side (-) to the Exhaust Air (EA) port.
- Use the reading displayed on your measurement device to cross reference the CFM output using the conversion chart.



NOTE: ERV airflows are to be balanced after all ductwork is installed.

Balancing of airflows is typically required by local or state building codes or by the HVAC design engineer.



NOTE: The tubing should extend in the pressure port approx. 1".



NOTE: These ports are carefully located on the unit to give the most accurate airflow measurement. Do not relocate pressure ports.

On every LE unit, a set of four pressure ports are installed on the end doors of both the front and rear modules. See images below.



FIGURE 6.4.0 PRESSURE PORT LOCATIONS (TYP)

CAUTION
The proper operating air-flow range for this model is 2500–11000 CFM.

DIFFERENTIAL STATIC ACROSS CORE DSP VS. CFM											
LE10X	DP (H ₂ O)	DSP	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
	Aiflow	CFM	2292	3438	4584	5730	6876	8022	9168	10314	11460

6.4.2 LE10X Filter Pressure Drop

LE10X Airflow (CFM)	2500	3125	3750	4375	5000	5625	6250	6875	7500	8125	8750	9375	10000	10625
2" MERV 8	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.16	0.17
2" MERV 13	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.12	0.14	0.15	0.17	0.18	0.20	0.22
4" MERV 8	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.07	0.08	0.09
4" MERV 13	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.12	0.13	0.14	0.16	0.17	0.19

NOTE: Pressure drop of clean 2" MERV 8 filters is included in the Unit Performance Ratings Table

FIGURE 6.4.1 CLEAN FILTER PRESSURE DROP TABLE (IN. W.G.)

6.4.3 Sheave Adjustment

All fan motors that are not controlled by a VFD are equipped with an adjustable sheave. These adjustable sheaves must be re-set in the field to attain optimum performance of the ERV. This adjustment is to be done after all ductwork is connected.

Adjustable sheaves are held in position on the drive motor shaft by a set screw that is normally hidden until the belt(s) is removed. One flange is fixed-position, the others are adjustable-position. The adjustable flanges of the sheave have a set screw located in an exposed position on the collar of the flange.

To adjust the flanges:

- ♦ Remove the drive belt(s)
- ♦ Loosen the set screws on both adjustable flanges
- ♦ IN HALF-TURN INCREMENTS, turn the adjustable flanges in or out the same number of turns
- ♦ Tighten the set screws on the adjustable flanges, making certain that the set screws are landing on the machined “flat” on the sheave.

6.4.4 Variable-Speed Units

The motors on variable-speed units also have adjustable sheaves, but they are not to be adjusted. Speed control of variable-speed units is accomplished by adjusting either the VFDs (if present) or the Integrated Commercial Controls (if present). For more information on adjusting VFDs, see the manual that was shipped with the unit. For more information on adjusting speeds via commercial controls, see the Integrated Commercial Controller manual that was shipped with the unit.

6.5 NORMAL OPERATION

Normal operation of the LE10X units involves continuous running of the fans, shutting down only for periodic maintenance. Various optional control devices may modulate the speed of the fans or may shut down one or more fans, but the fans always have power and are ready to run continuously.

Continuous operation is acceptable in virtually all conditions and the unit will not be damaged as long as air flow occurs. If filters become completely blocked due to lack of maintenance, airflow will be blocked and the blower motors may overheat.

Continuous operation during extreme cold weather may lead to frost.

6.6 EXTREME COLD OPERATION

LE10X units are capable of operating without internal frosting at temperatures down to -10°F, with indoor humidity below 40%. The units can operate under more severe conditions occasionally with little or no impact on their performance. At lower humidities, they can operate at still lower outside temperatures without freezing the enthalpic cores.

Some condensation or even frost may form on the outside of the unit or drip off the cabinet during very cold conditions, especially if the unit runs continuously. Exterior condensation during extreme cold conditions can be reduced or prevented by periodically cycling the unit OFF for several minutes to allow the cabinet to warm up.

⚠ WARNING

Danger of injury if unit starts unexpectedly. Switch power off at service disconnect. Lock-out/tag-out the disconnect.

⚠ WARNING

Danger of Electrical Shock when servicing an installed unit.

ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING! More than one disconnect switch may be required.

Proper Wiring Size Selection and Wiring Installation are the Responsibility of the Electrical Contractor.

7.0 UNIT MAINTENANCE

RenewAire ERVs are built to operate with minimal maintenance. After unit commissioning, the primary areas of attention are the air filters, periodic lubrication of the fan motors and annual vacuuming of the enthalpic cores.

7.1 MAINTENANCE 24 HRS. AFTER START-UP

24 hours after unit start-up:

- Readjust the tension on the motor drive belts.
- In new installations, check the air filters since they will often collect dust, dirt and debris at the time of start-up.

7.2 MAINTENANCE 30 DAYS AFTER START-UP

After 30 days of operation:

- Tighten all electrical connections, paying special attention to VFD wiring (if present).
- Readjust the tension on motor drive belts.
- Check the air filters as part of the normal monthly maintenance.

7.3 MAINTENANCE SCHEDULE

Experience on the part of the service person is the most important issue in establishing a maintenance schedule. There will be times of the year when frequent inspection of the filters will be required, such as spring and summer when there may be pollen, dust, dirt or debris from budding trees and bushes that can clog the filters. Also see Section 7.14 Maintenance Records in this manual.

7.4 FILTERS

Inspection and replacement of air filters is the most frequent maintenance issue. For units that do not have filter air pressure differential sensors, filters must be visually inspected monthly, as a minimum. If a filter looks discolored or dirty, REPLACE IT! When installing new filters, DO NOT USE filter sprays. Residue from the filter spray could migrate to the enthalpic core media and damage the cores.

For units that have filter air pressure differential sensors, a dirty filter alarm will occur on the connected alarm or control device.

Filter cleanliness and replacement is the most important and frequent maintenance issue. Dirty filters will cause an immediate reduction in operating efficiency of the ERV. Normally, filters should be inspected and changed when they are dirty. Paper filters are not to be cleaned, they are to be replaced. In general, if a filter looks dirty, replace it. The best indication of dirty filters is to check the pressure drop across the filter banks with an optional filter monitor. If it is not possible to check the pressure drop, the rule of thumb would be to change the filters every two months.

7.5 FAN MOTORS

The most important issues in motor maintenance are:

- Belt condition and belt tension
- Sheave condition
- Motor cleanliness
- Motor lubrication

7.5.1 Belt Tension

Premature or frequent belt failures can be caused by improper belt tension (either too loose or too tight) or misaligned sheaves. Abnormally high belt tension or drive misalignment will cause excessive bearing loads and may result in failure of the fan and/or motor bearings. Conversely, loose belts will cause squealing on start-up, excessive belt flutter, slippage and overheated sheaves. Both loose and tight belts can cause fan vibration.

Do not pry belts on or off the sheave. Loosen belt tension until the belts can be removed by simply lifting the belts off the sheaves. After replacing belts, ensure that slack in each belt is on the same side of the drive. Belt dressing should never be used.

The proper belt setting is the lowest tension at which the belts will not slip under peak load operation. For initial tensioning, set the belt deflection at $1/64$ " for each inch of belt span (measured half-way between sheave centers). Example: If the belt span is 16", the belt deflection should be $1/64$ ", or $1/4$ " (using moderate thumb pressure at mid-point of the drive). Check belt tension two times during the first 24 hours of operation and periodically thereafter.

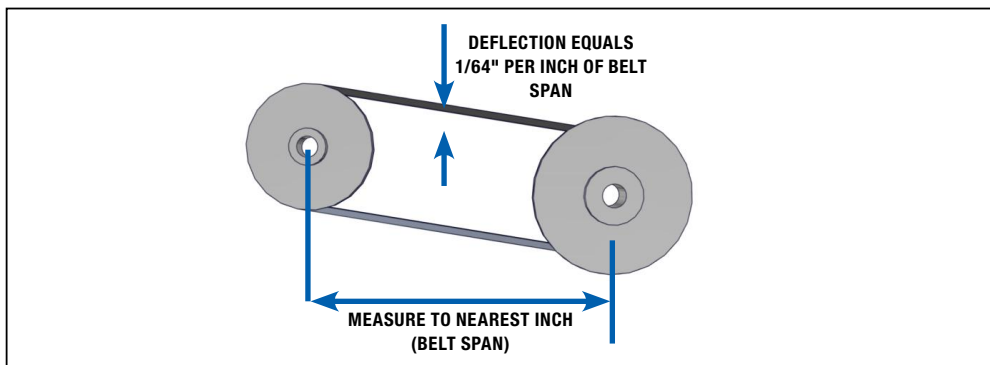


FIGURE 7.5.0 FAN BELT TENSIONING

7.5.1 Sheave Condition

Do not install new belts on worn sheaves. If the sheaves have grooves worn in them, they must be replaced before new belts are installed.

7.5.2 Motor Cleanliness

Removing dust and grease buildup on the motor housing assists proper cooling. Never wash-down the motor with high pressure spray.

7.5.4 Motor Lubrication

High efficiency motors have unique maintenance requirements that vary from motor to motor. Many smaller horsepower motors have sealed bearings that do not require periodic greasing. Larger horsepower motors come equipped with grease fittings. Before greasing any motor, consult the motor manufacturer's web site to determine the correct maintenance and greasing schedule.



NOTE: Each motor manufacturer specifies the frequency of maintenance and the amount and type of grease to use on the bearings. Do not mix different types of grease. Check the manufacturer's web site for each specific motor.

7.6 PILLOW BLOCKS

LE model ERVs use pillow block bearings to support the fan shaft. Maintenance requirements for pillow blocks depend on a combination of shaft size and shaft RPMs. The fan shaft diameter is typically 1.44".

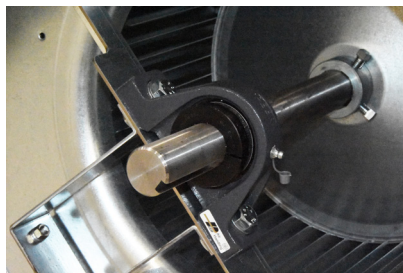


FIGURE 7.5.0 FAN PILLOW BLOCK

To grease pillow blocks, the fan should be at normal operating speed and temperature prior to greasing.

- The recommended interval for greasing of pillow block bearings is 3–6 months, based on 1,000–2,000 hours of operation.
- The recommended grease is Mobil Polyrex. If Mobil Polyrex is not available, use an NGLI#2 grease that is compatible with a lithium thickener, mineral base oil and a temperature range of -10 to +260°F.
- The recommended amount of grease is 2 grams.
- Clean the grease fitting (zerk) before attaching the grease gun.
- Grease slowly and stop when the first sign of grease seepage from the bearing's seals is observed.

Leave a small amount of grease on the zerk as a protective coating.

In all cases, Industry Best Practices should be observed. Maintain a record of every lubrication and the type of lubricant used.

7.7 ENTHALPIC CORES

⚠ CAUTION

Risk of DAMAGE TO ENTHALPIC CORES

Whenever working within the ERV cabinet, protect the enthalpic cores from accidental damage. The core media is subject to damage from dropped tools or other foreign objects.

7.7.1 Enthalpic Core Maintenance

The enthalpic core media is a fibrous material that must be kept clean at all times. As a minimum, cores should be cleaned once per year.

- DO NOT WASH OR ALLOW THE ENTHALPIC CORES TO GET WET.
- DO NOT EXPOSE THE ENTHALPIC CORES TO HIGH HEAT OR FLAMES.
- DO NOT DIRECT COMPRESSED AIR AT THE CORE MEDIA.
- DO NOT REMOVE THE ENTHALPIC CORES FROM THE ERV UNLESS NECESSARY.
- USE CAUTION WHEN WORKING AROUND THE ENTHALPIC CORES. DO NOT DROP TOOLS OR OTHER OBJECTS ON THE CORES, DO NOT BUMP OR TWIST THE CORES.

To access enthalpic cores for cleaning, remove the air filters.

To clean enthalpic cores, all exposed surfaces must be vacuumed with an attachment having long, soft bristles. The greatest buildup of dirt and dust will normally be on the leading 1–2 inches of the inlet side (closest to the air filters).

7.7.2 Enthalpic Core Removal

Before removing enthalpic cores, switch the main disconnect to OFF. Open the door to the Energy Recovery Module and simply pull each core straight out of its guides.

7.7.3 Enthalpic Core Replacement

Cores have foam gasketing on one end of each core. The core should be reinstalled so that the foam gasketing is toward the back of the ERV and the core label is facing toward the front.

When cores are removed from the ERV, they should be immediately protected from accidental damage, water, high heat or flames.

7.8 PLENUM DIVIDERS

⚠ CAUTION

RISK OF DAMAGE TO PLENUM DIVIDERS

Whenever working within the ERV cabinet, do not place significant weight on the plenum dividers. They are not intended to be load-bearing.

Inside each ERV, there are two vertical and two horizontal metal panels that separate the plenums. These panels are not intended to be load-bearing. When performing maintenance on the ERV, do not crawl on or place significant weight on these divider panels!

If it is necessary to go inside the ERV cabinet for maintenance purposes, it is recommended that the cores be removed to provide access. The floor of the ERV is reinforced to accept a person’s weight.



FIGURE 7.8.0 PLENUM DIVIDER PANELS

7.9 FAN/MOTOR REMOVAL

The fan and fan motor are part of an assembly that is mounted on a “sled”, which is then installed in the ERV on vibration isolators. See the Service Parts illustration on the preceding page. Also see photograph below. If it is ever necessary to remove a fan, it may be easier to remove the entire sled from the ERV. For some maintenance issues, it may be easier to remove the enthalpic cores and go inside the ERV.

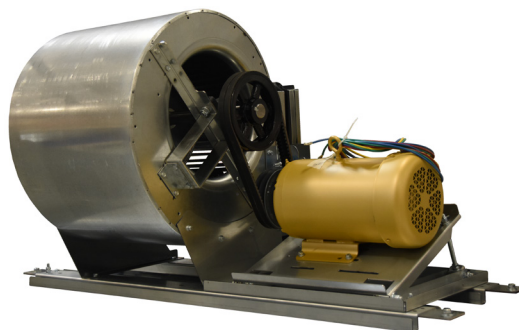


FIGURE 7.9.0 FAN AND MOTOR SLED

7.10 FILTER REPLACEMENT PRACTICES

RenewAire has provided a filter replacement tool called a filter extractor hook. See picture below. In addition, the filter spacers have a tab on the ends where a pull cord can be inserted. With a cord installed in the tab holes, it is possible to simply pull the cords and withdraw six filters at once. See image below. When installing the filter spacers, the foam strip is to be placed against the filter.

Note that when new filters are installed, the filter spacers may tend to fall off the end of the filter receiving channels. If this happens, simply install the spacers between the first two filters in from the door, instead of locating them against the access doors.

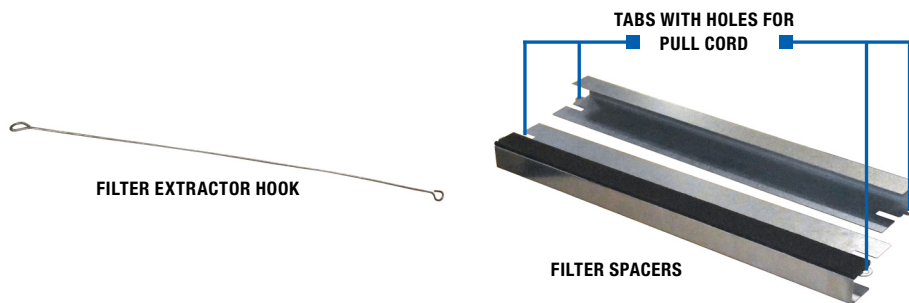


FIGURE 7.10.0 FILTER REPLACEMENT TOOL OPTIONS

If filter thickness is ever changed from 2" to 4" or from 4" to 2" thickness, each of 8 filter receivers will need to be adjusted up or down to accommodate the desired filter thickness. To make this adjustment, remove the second bolt set in from the door on each filter receiver and slide the movable filter receiver up or down against the fixed filter receiver bracket, following the “C” channel paths and replace the positioning bolt set in the proper hole that lines up at the other end of the “C” channel paths. The same filter spacers are used with either 2" or 4" filters.

7.11 DOOR LATCH ADJUSTMENT

With age and use, the door gaskets may become compressed and no longer provide a complete seal against air leakage. The door latches can be easily adjusted by changing the position of the swing arm on the inside of the door. See photo below.

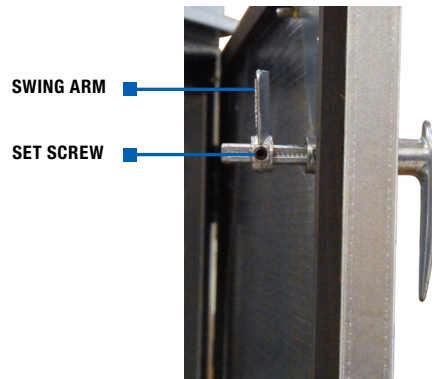




FIGURE 7.11.0 DOOR LATCH ADJUSTMENT

7.12 SHEAVE ADJUSTMENT

 **NOTE:** Use only BX-type cogged drive belts.

 **NOTE:** Low, Medium and High Blower RPM sheave settings overlap allowing some adjustability into lower or higher blower speed zones.

All fan motors that are not controlled by a VFD are equipped with an adjustable sheave. These adjustable sheaves must be re-set in the field to attain optimum performance of the ERV. This adjustment is to be done after all ductwork is connected.

Adjustable sheaves are held in position on the drive motor shaft by a set screw that is normally hidden until the belt(s) is removed. One flange is fixed-position, the others are adjustable-position. The adjustable flanges of the sheave have a set screw located in an exposed position on the collar of the flange.

To adjust the flanges:

- Remove the drive belt(s)
- Loosen the set screws on both adjustable flanges
- IN HALF-TURN INCREMENTS, turn the adjustable flanges in or out the same number of turns
- Tighten the set screws on the adjustable flanges, making certain that the set screws are landing on the machined “flat” on the sheave.

MOTOR HP	BLOWER SPEED	BLOWER RPM AVAILABLE BY VARIABLE MOTOR SHEAVE ADJUSTMENT											MOTOR SHEAVE	BLOWER SHEAVE
		633	653	673	694	714	735	755	776	796	817	837		
3 HP	Low	633	653	673	694	714	735	755	776	796	817	837	1VP44	BC78
3 HP	Medium	755	776	796	817	837	858	878	898	918	939	959	1VP50	BC90
3 HP	High	878	902	925	949	972	996	1020	1044	1067	1091	1115	1VP50	BC78
5 HP	Low	755	776	796	817	837	858	878	898	918	939	959	2VP50	D4900
5 HP	Medium	878	902	925	949	972	996	1020	1044	1067	1091	1115	2VP50	D4900
5 HP	High	1000	1021	1041	1062	1082	1102	1122	1143	1163	1184	1204	2VP62	D4900
7.5	Low	878	898	918	939	959	980	1000	1021	1041	1062	1082	2VP56	D4900
7.5	Medium	1000	1021	1041	1062	1082	1102	1122	1143	1163	1184	1204	2VP62	D4900
7.5	High	1122	1143	1163	1184	1204	1225	1245	1266	1286	1306	1326	2VP68	D4900
10	Medium	1000	1021	1041	1062	1082	1102	1122	1143	1163	1184	1204	2VP62	D4900
10	High	1122	1143	1163	1184	1204	1225	1245	1266	1286	1306	1326	2VP68	D4900

FIGURE 7.13.0 TABLE OF SHEAVE ADJUSTMENTS

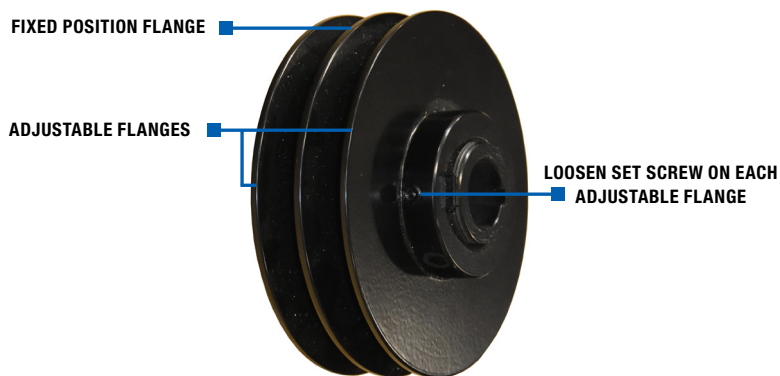


FIGURE 7.12.1 TWO-BELT ADJUSTABLE SHEAVE (TYP)

7.14 SERVICE PARTS

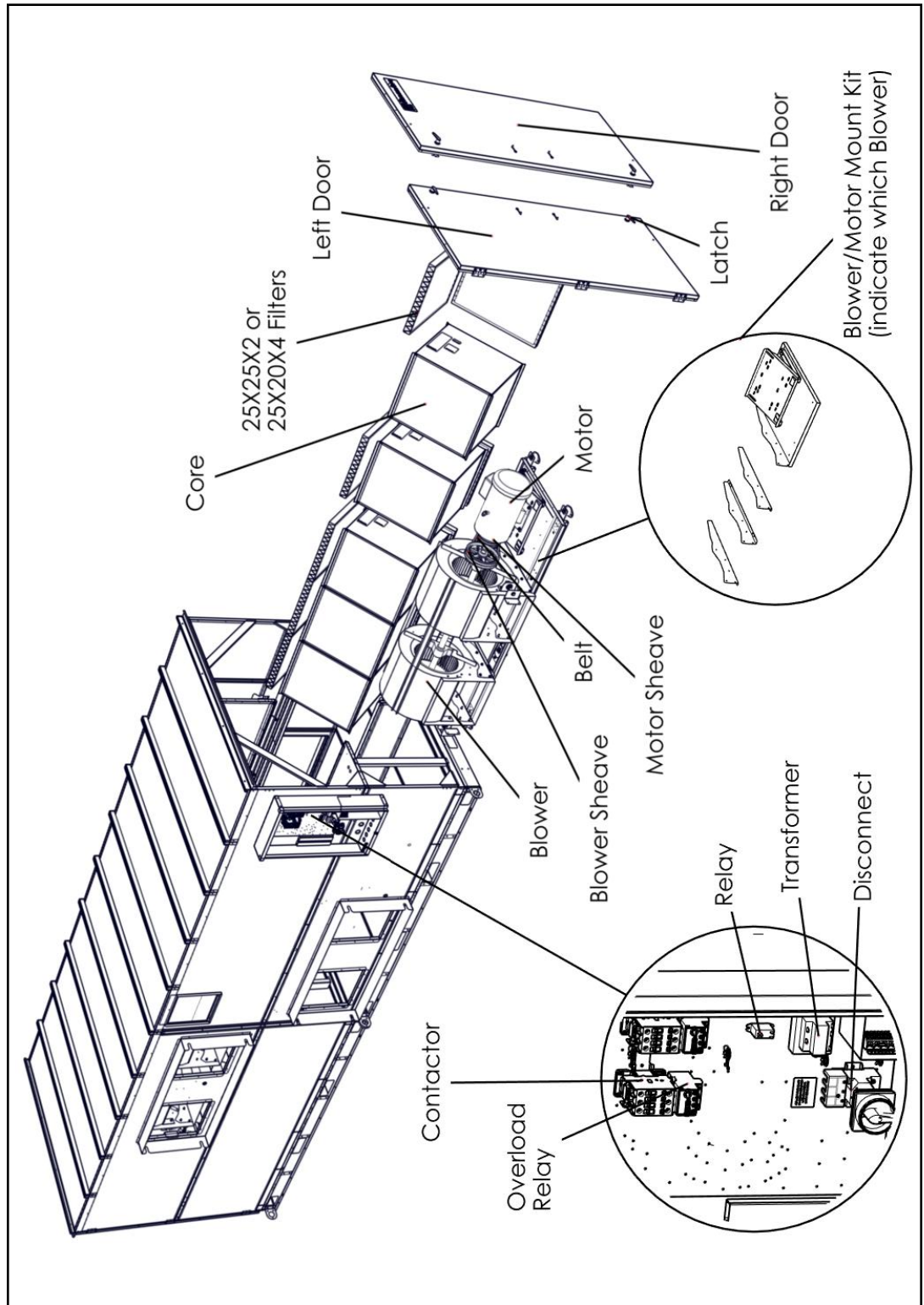


FIGURE 7.15.0 LE10XINH AND LE10XINV SERVICE PARTS

8.0 TROUBLESHOOTING

If problems occur with a RenewAire ERV, the primary resources for trouble-shooting are the unit as-built wiring schematics and the Sequence Of Operation (SOO) for each control scheme.

9.0 FACTORY ASSISTANCE

In the unlikely event that you need assistance from the factory for a specific issue, make sure that you have the information called for in the Unit Records page in the Owner Information section of this manual. The person you speak with at the factory will need that information to properly identify the unit and the installed options.

To contact RenewAire Customer Service:

Call 800-627-4499

Email: RenewAireSupport@RenewAire.com

Remember that RenewAire Customer Service can only assist with the products sold by RenewAire, it cannot resolve engineering issues that result from air handling system design by others.



About RenewAire

For over 40 years, **RenewAire** has been a pioneer in enhancing indoor air quality (IAQ) in commercial and residential buildings of every size. This is achieved while maximizing sustainability through our fifth-generation, static-plate, enthalpic-core **Energy Recovery Ventilators (ERVs)** that optimize energy efficiency, lower capital costs via load reduction and decrease operational expenses by minimizing equipment needs, resulting in significant energy savings. Our ERVs are competitively priced, simple to install, easy to use and maintain and have a quick payback. They also enjoy the industry's best warranty with the lowest claims due to long-term reliability derived from innovative design practices, expert workmanship and **Quick Response Manufacturing (QRM)**.

As the pioneer of static-plate core technology in North America, RenewAire is the largest ERV producer in the USA. We're **committed to sustainable manufacturing** and lessening our environmental footprint, and to that end our Waunakee, WI plant is 100% powered by wind turbines. The facility is also one of the few buildings worldwide to be LEED and Green Globes certified, as well as having achieved ENERGY STAR Building status. In 2010, RenewAire joined the Soler & Palau (S&P) Ventilation Group in order to provide direct access to the latest in energy-efficient air-moving technologies. For more information, visit: renewaire.com

201 Raemisch Road | Waunakee, WI | 53597 | 800.626.4499 | RenewAire.com