**WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer or service agency.

**SHIPPING AND PACKING LIST**

Package 1 of 1 contains: *See Illustration 1 and 2.*

- 1 - Energy Recovery System Assembly
- 1 - Outdoor Fresh Air Hood with Filter
- 1 - Outdoor Exhaust Air Hood with Barometric Damper
- 1 - Balancing Damper Assembly
- 1 - Hardware Bag:
  - 14’ - Gasket ¾" x 1 ¼"
  - 7’ - Gasket ¼" x ½"
  - 1 - Field Harness
  - 1 - Jumper Harness
  - 1 - ⅜" Bushing
  - 4 - Wire Ties
  - 6 - Mounting Screw(s) #14-16 x ¾"
  - 15 - Self-tapping Screw(s) 10-16 x ½"
  - 8 - Gold Screw(s) 10-16 x ½"
- 1 - Installation Instruction
- 2 - Wiring Stickers

**PRINCIPLE OF OPERATION**

The ERS enthalpy wheel contains parallel layers of a polymeric material that are impregnated with silica gel (desiccant). The wheel is located in the entering (intake) air and exhaust air streams of the ventilation equipment. As the wheel rotates through each air stream, the wheel surface adsorbs sensible and latent energy. In the heating mode, the wheel rotates to provide a constant transfer of heat from the exhaust air stream to the colder intake air stream. During the cooling season, the process is reversed.
CAUTION

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

GENERAL

These instructions are intended as a general guide and do not supersede local codes in any way. Authorities having jurisdiction should be consulted before installation.

REQUIREMENTS

When installed, the unit must be electrically wired and grounded in accordance with local codes or, in the absence of local codes, with the current National Electric Code, ANSI/NFPA No. 70.

SHIPPING DAMAGE

Check unit for shipping damage. Receiving party should contact last carrier immediately if shipping damage is found.

RIGGING UNIT FOR LIFTING

1. Maximum weight of unit is — 300 Lbs (crated).
2. Remove crating and retrieve hardware bag that is inside of ERS.
3. All ERS door panels must be in place for rigging.
4. Use straps to lift unit.

ROOFTOP UNIT PREPARATION

1. Disconnect all power to rooftop unit.
2. Open rooftop unit filter access door.
3. Remove the rooftop unit return air access panels. Also remove any hoods and/or power exhaust equipment. Discard hoods, power exhaust equipment, and horizontal return air panels. See Figure 1.
4. Drill \( \frac{3}{16} \)“ hole in divider panel. Insert \( \frac{3}{16} \)“ bushing into hole before installing ERS harness. See Figures 2 and 3.
5. If a factory install ERS Harness (J298/P153) is installed go to Step 6, otherwise use the provided harness from the hardware bag within the ERS and complete the following steps.
   A. Locate the field harness from the hardware bag shipped inside the ERS.
   B. With door panels open on the control side of RTU, route the wire harness bare ends (3 wires Green, Pink and Black) from return section along the RTU wire at the top of unit and through panel above the filter rack.
   C. Follow wires all the way through blower section.
   D. Route wire through the control section down to the IMC2 control board. Strip the wire ends 3/8“ if they have not been pre-done. Place the Green wire under screw terminal at J298-8 (Purple connector). Do the same routine for Pink at J298-10 and Black to J298-9. See Figure 4.
6. Install balancing damper in return air section. Loosen top of RTU by removing screws around return end of RTU. Remove screws from bottom of corner panel and pull out until the damper will slide in over duct opening. Once damper is installed replace all panels and screws in place. Put balancing damper in place with the damper blade at the bottom. See Figure 5. Loosen nut on linkage to set blades to 50% open and retighten nut.

7. Using wire ties neatly route the wires to clear any moving parts.

8. Route the 3-pin (connector P153 and wiring harness under the balancing damper and out the return air. Coil excess wire and route into return air of the rooftop unit. See Figure 6.

2. Attach bottom filler panel with platform support rail to bottom opening of rooftop unit aligning with screw holes used by removed door panel. Secure in place as shown in Figure 8.

3. Remove all screws holding the top panel of rooftop unit around the horizontal exhaust air opening. Ensure that the top and upper most return air opening panel will move upward at least 2".

4. Lift ERS at least three feet (3'). Remove four screws holding telescoping leg to guide and pull out leg. Reinsert the leg from the bottom with the flat foot under the unit and reinsert one of the screws to hold leg into place. The leg will need to be adjusted later when unit is in position.

5. Position ERS in front of horizontal exhaust air opening. Line up the ERS to the rooftop unit. Ensure that there are not any screws on the rooftop unit that will interfere with the mounting flanges of the ERS and if so remove them. Apply \( \frac{3}{8} \times \frac{1}{2} \) gasket around perimeter to ensure seal to ERS.

Note: Equipment support kit or equivalent should be used to under feet of standoff legs to prevent roof penetration. See Figure 9.

6. Lower ERS so that the straight flange closest to the filter access door lines up to side of rooftop unit. The top flange should tuck under the rooftop unit. The opposite side flange should fit just inside of the duct opening panel. Secure it to rooftop unit with 10-16 x \( \frac{1}{2} \) self-tapping screws (provided).

7. Remove the screws placed in the telescoping legs and adjust the legs on the ERS until it is level. Then replace all four screws in each leg to secure the ERS in the leveled position. See Figure 9.

INSTALL ENERGY RECOVERY SYSTEM

1. Apply \( \frac{3}{4} \times 1 \frac{1}{4} \) gasket to top and bottom decks of ERS as shown in the figure. See Figure 7.
8. Use provided 10-16 x ½” self-tapping screws to secure the side mounting flanges of the ERS to the rooftop unit.

9. Check and seal, if necessary, along the edges where the ERS meets the rooftop unit to ensure there is no air leakage. Final assembly should resemble Figure 10.

10. Remove the control access panel and locate the 3-pin connector P153 wiring harness that was previously routed into the return air of the rooftop unit. Plug the harness connector P153 into the connector J153 located at the bottom of the access door inside the ERS. See Figure 11 and Figure 12.

11. All electrical connections must conform to any local codes and the current National Electric Codes (NEC) and Canadian Electric Code (CEC). Refer closely to wiring diagram in unit and/or in these instructions for proper connections. Refer to the unit nameplate for the minimum circuit ampacity and maximum over current protection size. Electrical data is listed on unit rating plate and motor nameplates.

12. Connect line voltage power to ERS unit from ERS field provided or rooftop unit disconnect switch (disconnect must be properly sized). Then connect line voltage from disconnect switch through ERS knockout on middle post to control box per the wiring diagram. See Figure 13 and 14.

13. Ground unit with a suitable ground connection either through unit supply wiring or earth ground.

Note: Unit voltage entries must be sealed weather tight after wiring is complete.

14. Replace access panels onto the ERS unit and secure.

ROOFTOP UNIT WIRING
(See Field Wiring Diagram)

1. Open access panel to rooftop unit controls.

2. The minimum damper blade position must be adjusted on the IMC2 control board to the correct amount of outside air specified by the customer. Refer to Lennox rooftop unit manual for setting.

Wheel Adjustment

The Electronic Configuration To Order (ECTO) parameter must be set at ECTO 7.22 = 10 to indicate ERS is installed.

During default operation the ERS will start when the RTU unit blower is on.

The A55 (IMC2) uses the following parameters to control ERS. See Figure 15.
For Smoke Mode reference the Smoke Mode Operation table. Only positive pressure option is available.

Normal Operation

At startup, If ECTO 7.22 ≤ 10

(ERS Installed)

Blower on & Lennox economizer >
min. position

ERS on
D01 = 1
D02 = 0

Power Exhaust on
OR Free-Cooling

ERS on
D01 = 1
D02 = 1

Figure 15

Notes:
1. D01 (turns on B28, B26, B27 thru ERS controller) and D02 are relay outputs from Lennox IMC2 control board.
2. B28 - ERS Wheel Motor, B26 - ERS Exhaust Air Blower, B27 - ERS Fresh Air Blower

Smoke Mode Operation

<table>
<thead>
<tr>
<th>Smoke Mode Setting (ECTO 3.01)</th>
<th>Blower</th>
<th>D02</th>
<th>Damper</th>
<th>D01</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. unit off (default)</td>
<td>OFF</td>
<td>OFF</td>
<td>Closed</td>
<td>OFF</td>
</tr>
<tr>
<td>1. pos. pressure</td>
<td>ON</td>
<td>OFF</td>
<td>100% Open</td>
<td>ON</td>
</tr>
</tbody>
</table>

3. Close access panels on the rooftop unit and secure.
4. Restore power to unit.
5. Once ERS is working properly, caulk any open joints, holes, or seams to make the units completely air and water tight.
6. Leave this instruction manual with owner or in an envelope to be kept near unit.

OPTIONAL KITS (Factory Installed)

Motorized Intake Air Damper
Damper mounts behind the outdoor air intake hood. It opens when the ERS is energized and closes when de-energized. Powered by B30 damper motor.

Pressure Sensor
Measurement device on the ERS to determine airflow across the Enthalpy Wheel.

Low Ambient Control Kit (S26)
Prevents frost formation on energy wheel heat transfer surfaces by terminating the intake blower operation when discharge air temperature falls below a field selectable temperature setting. Intake blower operation resumes operation after temperature rises above the adjustable temperature differential.

The frost threshold is the outdoor temperature at which frost will begin to form on the ERS wheel. For energy recovery systems, the frost threshold is typically below 10°F. Frost threshold is dependent on indoor temperature and humidity. The table shows how the frost threshold temperatures vary depending on indoor conditions.

<table>
<thead>
<tr>
<th>FROST THRESHOLD TEMPERATURE</th>
<th>INDOOR RH AT 70°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>0°F</td>
</tr>
<tr>
<td>30%</td>
<td>5°F</td>
</tr>
<tr>
<td>40%</td>
<td>10°F</td>
</tr>
</tbody>
</table>

Because Energy Recovery Systems have a low frost threshold, frost control options are not necessary in many climates. Where outdoor temperatures may drop below the frost threshold during the ERS operational hours, exhaust only frost control option is available.

Stop-Start-Jog
Control option that allows intermittent operation of the enthalpy wheel during mild outdoor conditions to provide cycling and cleaning of the wheel.

BLOWER SPEED ADJUSTMENT

Blower speed selection is accomplished by adjusting the motor sheave on both fresh air and exhaust air blowers. All blowers are factory set in closed position for maximum airflow. To determine air flow setting, external static pressure readings will need to be read across the ERS. Reference Table 1 on Page 7. For location to take pressure readings, See Figure 16.
Recovery Wheel Mode
On a thermostat call for blower operation in heating, cooling or continuous blower, the ERS media will rotate between fresh air and exhaust air streams. Both the fresh air blower and exhaust blower will be operating.

SYSTEM CHECK
1. Disconnect ERS main power.

Note: If Low ambient kit S26 is used the jumper between TB37-5 and TB37-6 should be removed. Also if system check out is being conducted at low ambient temperatures, jumper low ambient switch.

2. Open rooftop unit blower access panel and locate TB1. Jumper terminals 6 (24v) and 3 (G) to energize rooftop unit blower. Refer to manufacturers instructions when an electronic thermostat or other energy management system is used.

3. Verify that the ERS (3) three phase blower motors are phased sequentially ensuring correct rotation and operation.
   a.) Disconnect power.
   b.) Reverse any two field power leads to the ERS.
   c.) Reapply power.

4. Disconnect main power to unit before making adjustment to balancing damper and/or ERS unit.

5. Remove all jumpers and replace ERS control access cover.

6. Set thermostat to normal operating position.

7. Restore power to unit.

MAINTENANCE
Motor Maintenance
All motors use prelubricated sealed bearings; no further lubrication is necessary.

Mechanical Inspection
Make visual inspection of dampers, linkage assemblies and ERS rotating bearings during routine maintenance. Filters should be checked periodically and cleaned when necessary. Filter is located in fresh air hoods. DO NOT replace permanent filters with throwaway type filters.

Belt Alignment
Proper alignment is essential to maintain long V-Belt life. Belt alignment should be checked every time belt maintenance is performed, each time the belt is replaced, and whenever sheaves are removed or installed.

Belt Installation
Always move the drive unit forward so the belt can be easily slipped into the groove without forcing them. Never force the belt into a sheave with a screw driver or wedge. You will damage the fabric and break the cords. It is recommended that the pulley center distances be offset by ¾” for proper length. This will allow the motor assembly to slide forward to remove belt and backward for belt tension.

Belt Tension
Measure the span length (center distance between pulleys when belt is snug). Mark center of span, then apply a force (6 to 9 Lbs on new belts) perpendicular to the span large enough to deflect the belt ⅛” for every inch in span length.

Energy Wheel Maintenance
Four pie-shaped energy recovery wheel segments are seated on stops between the stainless steel spring retainers, secured to the hub and rim of wheel. Annual inspection of the self cleaning wheel is recommended. With power disconnected, remove ERS access panels (rear) and unplug (J150 & P150). Refer to wiring diagram in this instruction manual. Each segment is secured in place by a stainless steel spring retainer located on wheel rim. Remove one end of the stainless steel spring retainer from the slot in the wheel rim and remove. Do the same on the next retainer. Remove segment and wash with water and/or mild detergent. Replace segment by reversing the above procedure. See Figure 17. Discoloration and staining of ERS segment does not affect its performance. Only excessive buildup of foreign material need be removed. If the segment appears excessively dirty, it should be cleaned to ensure maximum operating efficiency. Thoroughly spray plastic surface with household cleaner such as Fantastic® or equivalent middle detergent and gently rinse with warm water using a soft brush to remove heavier accumulation. Shake excess water from segment and replace in reverse of removal instructions.

Figure 17
ENERGY RECOVERY SYSTEMS

SCFM vs. PRESSURE DROP

Equation of line: SCFM = (PD - 0.0492647) / 0.0005721

TABLE #1

<table>
<thead>
<tr>
<th>SCFM</th>
<th>900 RPM</th>
<th>1000 RPM</th>
<th>1100 RPM</th>
<th>1200 RPM</th>
<th>1300 RPM</th>
<th>1400 RPM</th>
<th>1500 RPM</th>
<th>1600 RPM</th>
<th>1700 RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>900</td>
<td>1000</td>
<td>1100</td>
<td>1200</td>
<td>1300</td>
<td>1400</td>
<td>1500</td>
<td>1600</td>
<td>1700</td>
</tr>
</tbody>
</table>

50R2051xH Series
NOTE - IF ANY WIRE IN THIS APPLIANCE IS REPLACED IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING, TERMINATION AND INSULATION THICKNESS.

WARNING - ELECTRIC SHOCK HAZARD. CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES. DISCONNECT ALL POWER BEFORE SERVICING.

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED WRC/CEC CLASS I

WIRING DIAGRAM
02/10

ACCESSORIES
FIXED ENERGY RECOVERY WHEEL
FOR ENERGENCE AND LANDMARK - G, J, M, Y

SECTION F
REV. 1.0

Supersedes: New Form No.
537330-01
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Lennox Commercial
<table>
<thead>
<tr>
<th>Lennox Model No.</th>
<th>Req’d Curb Height</th>
<th>CFM Range</th>
<th>Voltage</th>
<th>Phase</th>
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<tr>
<td>50R2051xH23</td>
<td>14”</td>
<td>1000-1700</td>
<td>208-230</td>
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<tr>
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<td>1000-1700</td>
<td>460</td>
<td>3</td>
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<tr>
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<td>14”</td>
<td>1000-1700</td>
<td>575</td>
<td>3</td>
</tr>
</tbody>
</table>

ERS Layout

![ERS Layout Diagram](image-url)

- Clearance 42"
- Clearance 40"
- Clearance 24"
- 50R2051xH
- 012104808 Equipment Support
- 002014714 Roof Curb
- 502014714 Roof Curb
- 60.396
- 5.378
- 18.656
- 48.000
START UP INFORMATION SHEET

VOLTAGE - ERS UNIT

In coming Voltage L1-L2_________ L1-L3_________ L2-L3_________

Running Voltage L1-L2_________ L1-L3_________ L2-L3_________

Secondary Voltage______________ C (black) to G (green) Volts*______________

C (black) to W (white) Volts*______________

* With thermostat calling.

AMPERAGE - ERS MOTORS

Intake Motor: Nominal HP_________ Rated Amps_________ Running Amps_________

Exhaust Motor: Nominal HP_________ Rated Amps_________ Running Amps_________

Wheel Motor: Nominal HP_________ Rated Amps_________ Running Amps_________

AIRFLOW

Intake Design CFM_________ Pressure Drop_________ Calculated CFM_________

Exhaust Design CFM_________ Pressure Drop_________ Calculated CFM_________

Amb. db Temp_________ Return Air db Temp*_________ Tempered Air db Temp*_________

Amb. wb Temp_________ Return Air wb Temp*_________ Tempered Air wbTemp*_________

* Measure after 15 minutes of run time

INSTALLATION CHECK LIST

Model # __________________________ Serial # __________________________

Owner ____________________________ Owner Phone # __________________________

Owner Address __________________________

Installing Contractor __________________________ Start Up Mechanic __________________________

☐ Inspect the unit for transit damage and report any damage on the carrier’s freight bill.

☐ Check model number to insure it matches the job requirements.

☐ Install field accessories and unit adapter panels as required. Follow accessory and unit installation manuals.

☐ Verify field wiring, including the wiring to any accessories.

☐ Check all multi-tap transformers, to insure they are set to the proper incoming voltage.

☐ Verify correct belt tension, as well as the belt/pulley alignment. Tighten if needed.

☐ Prior to energizing the unit, inspect all the electrical connections.

☐ Power the unit. Bump the motor contactor to check rotation. Three phase motors are synchronized at the factory. If blower motor fans are running backwards, de-energize power to the unit, then swap two of the three incoming electrical lines to obtain proper phasing. Re-check.

☐ Perform all start up procedures outlined in the installation manual shipped with the unit.

☐ Fill in the Start Up Information as outlined on the opposite side of this sheet.

☐ Provide owner with information packet. Explain the thermostat and unit operation.