**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.

**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 — 1000 Lbs.
2. Remove crating and retrieve hardware bag that is attached to back of control box inside ERS. Also retrieve ERS support rail, (2) door filler panels and top filler panel.
3. All ERS door panels must be in place for rigging.
4. Lifting lugs are supplied with the unit. Loosen machine bolts and rotate lifting lug. Retighten bolt before lifting.

ROOFTOP UNIT PREPARATION
1. Disconnect all power to rooftop unit.
2. Open filter access door.
3. Remove the rooftop unit horizontal supply air and return air access panels. Also remove any hoods and/or power exhaust equipment. Discard hoods, power exhaust equipment, and horizontal supply and return air access panels. See Figure 1.
4. If a factory install ERS Harness (J298/P153) is installed go to Step 5, 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. See Figure 2.
   C. Follow wires all the way through blower section. See Figure 3.
   D. Continue to follow wires along the top and through divider panel into the control center. See Figure 4.
E. 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 5.

5. Slide in balancing damper over return air duct. Put balancing damper in place with the damper blade at the bottom. See Figure 6. Loosen wing nut on adjustable quadrant, rotate arm to set blades to 50% open and retighten wing nut. See Figure 7.

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

1. Apply ¾" x 1 ¼” gasket to top and bottom decks of ERS as shown in the figure. See Figure 9.

2. Install door filler panels (provided) with panel having rectangular hole at the bottom and panel with "U" shaped opening at the top. See Figure 10.

6. Using wire ties neatly route the wires to clear any moving parts.
3. Position ERS support rail with notched flange pointing away from rooftop unit. Center ERS support rail by using the center hole of rail and aligning it with the center hole in the base pan of the return opening. Use (5) of the 14-16 x ¾" screws provided to secure rail to base of unit. Apply ¾" x 1 ¼" gasket along face of the ERS support rail. See Figure 11.

![ERS SUPPORT RAIL](image1)

Figure 11

4. Lift and move ERS unit into position in front of horizontal exhaust air opening. See Figure 12.

![ERS SUPPORT RAIL](image2)

Figure 12

5. Using lifting lugs, raise ERS unit approximately three (3') feet. Remove nut and bolt assembly to slide telescoping part of leg out of guide from the top and reinset into bottom of guide having attached flat foot under unit. Do not fasten tightly, adjustment will need to be made when ERS is put into position on unit. See Figure 13 and Figure 14.

![ERS SUPPORT RAIL](image3)

Figure 13

![ERS SUPPORT RAIL](image4)

Figure 14

Note: Equipment support kit or equivalent should be used under feet of standoff legs to prevent roof penetration. See Figure 14.

6. Lower ERS into ERS support rail catching the front edge of the ERS bottom into the ½" flange. Slide the ERS so that it is tight against the door filler panel.

7. With the ERS in place, adjust the telescoping legs to level and support ERS against rooftop unit. Tighten securely. Rotate lifting lug to original position and tighten machine bolts.

8. Secure ERS to RTU with provided 10-16 x ½" gold screws through ERS side flanges to door filler panels installed earlier. See Figure 15.

9. Insert remaining top filler panel with the notches upward under the top of the RTU to cover the top flange of ERS. See Figure 15.

![TOP FILLER PANEL](image5)

Figure 15

10. 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 16.
11. 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 17 and Figure 18.

14. 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.

15. 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 20.

For Smoke Mode reference the Smoke Mode Operation table. Only positive pressure option is available.

**Smoke Mode Operation**

<table>
<thead>
<tr>
<th>Smoke Mode Setting (ECTO 5.01)</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.
**BLOWER SPEED ADJUSTMENT**

Blower speed selection is accomplished by changing the sheave setting on both fresh air and exhaust air blowers. All blowers are factory set at "closed" 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 8. For location to take pressure readings See Figure 21.

---

**BLOWER SPEED ADJUSTMENT**

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.

---

**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.

**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 10F. Frost threshold is dependent on indoor temperature and humidity. The table shows how the frost threshold temperatures vary depending on indoor conditions.

---

**OPERATION**

**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 air 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**
Eight pie-shaped energy recovery wheel segments, are seated on stops between the segment retainer which pivots on the wheel rim and 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 and P150] (Refer to wiring diagrams in this instruction manual). Remove segment and wash with water and/or mild detergent.
ENERGY RECOVERY SYSTEMS

SCFM vs. PRESSURE DROP

Equation of line: SCFM = (PD + 0.01)/0.00036

TABLE #1

<table>
<thead>
<tr>
<th>SCFM</th>
<th>PRESSURE DROP (in. w.C.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>1500</td>
</tr>
<tr>
<td>0.20</td>
<td>1600</td>
</tr>
<tr>
<td>0.40</td>
<td>1700</td>
</tr>
<tr>
<td>0.60</td>
<td>1800</td>
</tr>
<tr>
<td>0.80</td>
<td>1900</td>
</tr>
<tr>
<td>1.00</td>
<td>2000</td>
</tr>
<tr>
<td>1.20</td>
<td>2200</td>
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<tr>
<td>1.40</td>
<td>2400</td>
</tr>
<tr>
<td>1.60</td>
<td>2600</td>
</tr>
<tr>
<td>1.80</td>
<td>2800</td>
</tr>
</tbody>
</table>

ERS 1100 RPM  1000 RPM  900 RPM  800 RPM
KEY

A131 | CONTROL, FIXED WHEEL
B26 | MOTOR, EXHAUST AIR BLOWER
B27 | MOTOR, FRESH AIR BLOWER
B28 | MOTOR, DESICCANT WHEEL
B30 | MOTOR, DAMPER (OPTIONAL)
C23 | CAPACITOR, WHEEL MOTOR
C20 | CIRCUIT BREAKER, DESICCANT WHEEL
D143 | DELAY, CYCLE CONTROL
F29 | FUSE, DESICCANT WHEEL
J33 | JACK, CYCLE CONTROL
J34 | JACK, CYCLE CONTROL HARNESS
J40 | JACK, WHEEL CYCLE
J48 | JACK, VARIABLE SPEED
J50 | JACK, TRANSFORMER
J51 | JACK, EXHAUST BLOWER
J56 | JACK, DAMPER MOTOR PCB
J148 | JACK, FRESH AIR BLOWER
J50 | JACK, WHEEL MOTOR
J51 | JACK, EXHAUST BLOWER MOTOR
J52 | JACK, TRANSFORMER EXHAUST BLOWER
J160 | JACK, DAMPER MOTOR
K94-1,2 | RELAY, ON-OFF
K163, -1 | CONTACTOR, EXHAUST AIR BLOWER
K164, -1 | CONTACTOR, FRESH AIR BLOWER
P33 | PLUG, CYCLE CONTROL
P34 | PLUG, CYCLE CONTROL HARNESS
P30 | PLUG, WHEEL CYCLE
P48 | PLUG, VARIABLE SPEED
P50 | PLUG, TRANSFORMER
P51 | PLUG, EXHAUST BLOWER
P56 | PLUG, DAMPER MOTOR (OPTIONAL)
P148 | PLUG, FRESH AIR BLOWER
P150 | PLUG, WHEEL MOTOR
P151 | PLUG, EXHAUST BLOWER MOTOR
P152 | PLUG, TRANSFORMER EXHAUST BLOWER
P160 | PLUG, DAMPER MOTOR
S23 | SWITCH, LOW AMBIENT CUT IN
S26 | THERMOSTAT, AMBIENT
S51 | SWITCH, DOOR INTERLOCK
S125 | SWITCH, AMBIENT OVERRIDE
T27 | TRANSFORMER, DESICCANT WHEEL
T28 | TRANSFORMER, STEP DOWN WHEEL MOTOR

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.

note - for use with copper conductor only refer to unit rating plate for minimum circuit ampacity and maximum overcurrent protection size

remove jumper to install field optional low ambient switch

step down transformer assembly for 480 and 600 volt units only

M (380-420 50 Hz 3 φ) voltage hook up

WIRING DIAGRAM

ACCESSORIES

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

SECTION F

Supersedes
New Form No.
537330-01

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Lannox 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>
</tr>
</thead>
<tbody>
<tr>
<td>50R2852xM23</td>
<td>14”</td>
<td>1500-2200</td>
<td>208-230</td>
<td>3</td>
</tr>
<tr>
<td>50R2852xM33</td>
<td>14”</td>
<td>1500-2200</td>
<td>460</td>
<td>3</td>
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<tr>
<td>50R2852xM43</td>
<td>14”</td>
<td>1500-2200</td>
<td>575</td>
<td>3</td>
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<tr>
<td>50R2852xH23</td>
<td>14”</td>
<td>2200-2800</td>
<td>208-230</td>
<td>3</td>
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<tr>
<td>50R2852xH33</td>
<td>14”</td>
<td>2200-2800</td>
<td>460</td>
<td>3</td>
</tr>
<tr>
<td>50R2852xH43</td>
<td>14”</td>
<td>2200-2800</td>
<td>575</td>
<td>3</td>
</tr>
</tbody>
</table>

ERS Layout

![ERS Layout Diagram](image-url)
START UP INFORMATION SHEET
VOLTAGE - ERS UNIT

Incoming 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.