**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 - Intake Air Hood with Filter
1 - Exhaust Hood with Barometric Damper
1 - ERS Support Rail
2 - Door Filler Panels
1 - Top Filler Panel
1 - Hardware Bag:
   - 14’ - Gasket ¾” x 1 ¼”
   - 7’ - Gasket ¾” x ½”
   - 1 - Field Wire Harness
   - 4 - Wire Ties
   - 10 - Self-tapping Screw(s) #10-16 x ½”
   - 8 - Gold Screw(s) #10-16 x ½”
   - 5 - Mounting Screw(s) #14-16 x ¾”
1 - Installation Instruction
2 - Wiring Sticker(s)

**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. When the temperatures are mild the wheel pivots out of the air stream to allow economizer to operate normally for "free cooling" when outdoor temperature and humidity is acceptable. During economizer operation, the ERS exhaust blower continues to run, providing power exhaust for the system. The intake blower is de-energized during economizer operation.

---

**Illustration 1**

**Illustration 2**
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. If installing a pivoting wheel verify and/or install an internal modulating economizer. See Figure 1.
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 economizer and control side of RTU, route the wire harness bare ends (3 wires Green, Pink and Black) from economizer 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. The economizer may use an A7 enthalpy sensor located on the division panel between the economizer outdoor air and return air dampers. If present, the sensor must be moved to the intake air section of the ERS. Disconnect sensor A7 wires from logic module, remove screws securing the sensor, and retain sensor assembly and screws. See Figure 6.

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

7. Route the 6-pin connector P153 and wiring harness under the economizer and out the return air. Coil excess wire and route into return air of the rooftop unit. See Figure 7.

---

INSTALL ENERGY RECOVERY SYSTEM

1. Apply ¾” x 1 ¼” gasket to top and bottom decks of ERS as shown in the figure. See Figure 8.

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 9.

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 10.
4. Lift and move ERS unit into position in front of horizontal exhaust air opening. See Figure 11.

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 reinsert 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 12 and Figure 13.

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 14.

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 14.

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 15.

11. Remove the control access panel and locate the 6-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 16 and Figure 17.

Note: Equipment support kit or equivalent should be used under feet of standoff legs to prevent roof penetration. See Figure 13.
12. Installations using an A7 enthalpy sensor - Remove the screws to the filter access panel of the fresh air hood on the ERS and remove the air filter. Reinstall the A7 enthalpy control sensor with retained screws removed on the bottom panel of the fresh air intake hood. See Figure 18.

13. If the A7 enthalpy sensor was retained, locate the blue and purple wire harness on the top deck. Remove the intake air access panel and route blue and purple harness to the A7 enthalpy sensor harness and connect P104 to J193. Secure excess wiring. See Figure 19.

14. 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.

15. Connect line voltage power to ERS unit from rooftop unit disconnect switch through the knock out near the exhaust air hood. Connect the line voltage to the ERS control box per the wiring diagram. See Figure 20.

16. 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.

17. Replace access panels onto the ERS unit and secure.
1. Open access panel to rooftop unit controls.
2. The minimum damper blade position must be adjusted on the economizer control board to the correct amount of outside air specified by the customer. Refer to Lennox rooftop unit manual for setting.

**Wheel Pivot Adjustment**

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

In the A55 Integrated Modular Controller II (IMC2) [Prodigy] of the RTU setting is required for the economizer to go to minimum outside air.

During default operation the ERS will start when the RTU unit blower is on and dampers are at minimum position. The wheel will pivot out of the fresh air stream at power exhaust signal or free-cooling demand.

The A55 (IMC2) uses the following parameters to control wheel position.

See Figure 21.

For Smoke Mode reference the Smoke Mode Operation table.

**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>
<tr>
<td>2, purge</td>
<td>ON</td>
<td>ON</td>
<td>Closed</td>
<td>ON</td>
</tr>
<tr>
<td>4, neg. pressure</td>
<td>OFF</td>
<td>ON</td>
<td>Closed</td>
<td>ON</td>
</tr>
<tr>
<td>5, neg. pressure</td>
<td>OFF</td>
<td>ON</td>
<td>100% Open</td>
<td>ON</td>
</tr>
<tr>
<td>6, neg. pressure</td>
<td>ON</td>
<td>ON</td>
<td>Closed</td>
<td>ON</td>
</tr>
<tr>
<td>7, neg. pressure</td>
<td>OFF</td>
<td>ON</td>
<td>Closed</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.

**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>INDOOR RH AT 70°F</th>
<th>FROST THRESHOLD TEMPERATURE</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.

**ECONOMIZER SETTINGS**

Refer to economizer instructions for minimum air flow requirement. The damper end switch(es) setting on the internal economizer damper assembly are field adjustable to any position above minimum air flow for fresh air requirements at the customers specified 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.

**Economizer/Power Exhaust Mode**

On the activation of the economizer mode (closure of EH and EH1 of logic module), the ERS unit will shutdown for approximately 60 seconds to allow the ERS media to pivot out of the air stream. After this delay timer has been satisfied, the exhaust air blower will operate. The ERS unit will act as a power exhaust unit. See Figure 23.

**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 airflow setting, external static pressure readings will need to be read across the ERS Reference Table #1 on Page 9. For location to take pressure readings See Figure 22.

This mode will continue until economizer has been deactivated. The exhaust air blower will shut down and the delay timer will be activated. During this time period the ERS media will pivot back into the air stream. When timing is complete the unit will operate in the Recovery Wheel Mode. See Figure 24.

**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. Remove ERS control access panel and install jumper at low voltage terminal strip between TB37-1 and TB37-2.

4. Restore power to ERS unit. The recovery wheel will pivot out of the air stream, fresh air dampers will open, and after a delay, the exhaust blower will operate.

5. Remove jumper(s) from low voltage terminal block TB37. View pivoting of media back into air stream and closing of fresh air dampers. After delay timer has cycled then both fresh air blower and one exhaust air blower will operate.

6. 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.

7. Disconnect main power to unit before making adjustment to economizer and/or ERS unit.

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

9. Set thermostat to normal operating position.

10. Restore power to unit.
**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 1/64" 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.

---

<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>50P2852xM23</td>
<td>14”</td>
<td>1500-2200</td>
<td>208-230</td>
<td>3</td>
</tr>
<tr>
<td>50P2852xM33</td>
<td>14”</td>
<td>1500-2200</td>
<td>460</td>
<td>3</td>
</tr>
<tr>
<td>50P2852xM43</td>
<td>14”</td>
<td>1500-2200</td>
<td>575</td>
<td>3</td>
</tr>
<tr>
<td>50P2852xH23</td>
<td>14”</td>
<td>2200-2800</td>
<td>208-230</td>
<td>3</td>
</tr>
<tr>
<td>50P2852xH33</td>
<td>14”</td>
<td>2200-2800</td>
<td>460</td>
<td>3</td>
</tr>
<tr>
<td>50P2852xH43</td>
<td>14”</td>
<td>2200-2800</td>
<td>575</td>
<td>3</td>
</tr>
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</table>
### 50P2852xM/H Series

#### ENERGY RECOVERY SYSTEMS

**SCFM vs. PRESSURE DROP**

<table>
<thead>
<tr>
<th>SCFM (in. of W.C.)</th>
<th>012106008</th>
<th>1100 RPM</th>
<th>1000 RPM</th>
<th>900 RPM</th>
<th>800 RPM</th>
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</thead>
<tbody>
<tr>
<td>PRESSURE DROP (in. of W.C.)</td>
<td>1.30</td>
<td>1.31</td>
<td>1.31</td>
<td>1.30</td>
<td>1.28</td>
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<td>0.99</td>
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<td>0.74</td>
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<td>0.31</td>
<td>0.30</td>
<td>0.29</td>
<td>0.28</td>
</tr>
</tbody>
</table>

**Equation of line:** \( SCFM = \frac{(PD + 0.01)}{0.00036} \)

**TABLE#1**

---

ERS Lay out

- Clearance 24"
- Clearance 36"
- Clearance 48"
- 50P2852xM
- 50P2852xH
- 502013214 Roof Curb
- Equipment Support
- 012106008
- 56.078
- 60.000
- 11.219

---

**PAGE 9**
DELET A7 AND A62 (IF USED) FOR EITHER GLOBAL ENTHALPY OR SENSIBLE TEMPERATURE CONTROL.

FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR.

OPTIONAL EXHAUST DAMPER ACTUATOR TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED.

S118 USED ON 35 TO 50 TON EMERGENCE UNITS WITH ENERGY RECOVERY WHEEL (ERW).

REPOSITION A7 ENTHALPY SENSOR FROM ROOFTOP UNIT ENTHALPY INTO INTAKE HOOD OF THE ERW/ROOFTOP UNIT.

REMOVE JUMPER WHEN INSTALLING OPTIONAL LOW AMBIENT SWITCH.

NOTE: THIS DIAGRAM USED ONLY WHEN ECONOMIZER OR MOTORIZED OUTDOOR AIR DAMPERS ARE INSTALLED.

DESIGNATES OPTIONAL WIRING CLASS II FIELD WIRING.
START UP INFORMATION SHEET

VOLTAGE - ERS UNIT

Incom ing 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.