SHIPPING AND PACKING LIST

Package 1 of 1 contains: See Illustration 1 and 2.
1 - Energy Recovery Ventilator Assembly
1 - Outdoor Fresh Air Hood with Filter
1 - Outdoor Exhaust Air Hood with Barometric Damper
1 - ERS Support Rail
1 - Adaptor Panel
1 - Balancing Damper Assembly (Fixed Only)
1 - Hardware Bag:
20' - Gasket ¾" x 1 ¼"
7' - Gasket ½" x ½"
1 - Enthalpy Harness
1 - Field Harness
4 - Wire Ties
12 - Self-Tapping Screws 10-16 x ½"
8 - Gold Screws 10-16 x ½"
1 - Installation Instruction

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. For pivoting applications, 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.

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.
ROOFTOP UNIT PREPARATION

1. Disconnect all power to rooftop unit.
2. Open filter access door. If installing pivoting wheel verify and/or install an internal modulating economizer.
3. Remove the rooftop unit horizontal 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.

If installing fixed wheel skip to step 8

4. 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 2.

5. Disconnect plug P4 from connector J4.
6. Install the provided ERS field harness between J4 and P4 by plugging P27 into J4, plugging J27 into P4 harness.
7. Plug purple and blue wires from ERS field harness into logic module at SO+ (purple) and SO (blue).

**If installing pivoting wheel skip to step 10**

8. Slide in balancing damper on economizer rails. Put balancing damper in place with the damper blade at the bottom. Balancing damper mounts in place of the economizer shown in **Figure 3**. Loosen wing nut on adjustable quadrant, rotate arm to set blades to 50% open and retighten wing nut. **See Figure 4**.


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

11. Route the 6-pin (pivoting) 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 5**.

12. Apply ¾" x 1 ¼" gasket to top and bottom decks of ERS as shown in the figure. **See Figure 6**.

13. Install new adaptor panel over balancing damper and secure. **See Figure 7**.

14. Locate ERS support rail and install on the bottom of the return air opening of adaptor panel with flange pointing upward. **See Figure 7**.

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

**INSTALL ENERGY RECOVERY SYSTEM**

1. 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.

2. 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.

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

3. Lower ERS onto ERS support rail catching the front edge of ERS bottom onto the ½" flange. Lift rear of ERS to rotate face against rooftop unit and secure with the existing rooftop unit screws and the provided 10-16 x ½" self-tapping screws. Tuck turned up flange on ERS top under top flange of rooftop unit. Secure into place. **See Figure 7**.

4. Remove the screws placed in the telescoping legs and adjust the legs on the ERS until it is level. Replace all four screws in each leg to secure the ERS in the leveled position. **See Figure 8**.
5. 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 9.

6. Remove the right front (rooftop unit side) access panel and locate the field wiring harness that was previously routed into the return air of the rooftop unit. Plug the field wiring harness into the connector located at the bottom of the access door inside the ERS. See Figure 10.

**If installing fixed wheel skip to step 10**

7. Locate the A7 enthalpy control sensor (if removed earlier from the rooftop unit.)

8. 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 11.

9. 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 (provided) to J193. Secure excess wiring. See Figure 12 and Page 8 field wiring diagram.

10. 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.

11. 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 back panel to control box per the wiring diagram. See Figure 13 and 14.

12. 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.**

13. 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 economizer logic module to the correct amount of outside air specified by the customer. Refer to Lennox rooftop unit manual for setting.
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 ventilators, 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>
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<tr>
<td>40%</td>
<td>10°F</td>
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</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 (Fixed only)**
Control option that allows intermittent operation of the enthalpy wheel during mild outdoor conditions to provide cycling and cleaning of the wheel.

**ECONOMIZER SETTINGS (Pivoting Only)**
Refer to economizer instructions for minimum air flow requirement. The damper setting on the internal economizer assembly are field adjustable to any position above minimum air flow for fresh air requirements at the customers specified conditions.

**BLOWER SPEED ADJUSTMENT**
Blower speed selection is accomplished by changing the speed tap wire (refer to wiring diagram) on both fresh air and exhaust air blowers. All blowers are factory set at “high” for maximum airflow. To determine air flow setting, external static pressure readings will need to be read across the ERS. Reference Table 1. For location to take pressure readings. See Figure 9.
1. Disconnect ERS main power.

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 blower dampers will open, and after a delay, the exhaust blower will operate.

5. Remove jumper from ERS control board TB37-1 and TB37-2. The recovery wheel will pivot into the air stream, the fresh air blower dampers will close, and after a delay, the fresh air blower and exhaust air blower will operate.

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

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

8. Set thermostat to normal operating position.

9. Restore power to unit.

**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 fixed wheel skip to step 6

4. Restore power to ERS unit.

5. The recovery wheel will pivot out of the air stream, fresh air blower dampers will open, and after a delay, the exhaust blower will operate.

6. Remove jumper from ERS control board TB37-1 and TB37-2. The recovery wheel will pivot into the air stream, the fresh air blower dampers will close, and after a delay, the fresh air blower and exhaust air blower will operate.

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.

**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.

**Energy Wheel Maintenance**

Four pie-shaped ERW 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 15. 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.
Equation of Line: $SCFM = (PD - 0.0568182) / 0.0010455$

Table #1
Reposition enthalpy control (A7) into intake hood of ERS from rooftop unit economizer.
2. Remove jumper to install optional low ambient switch.
3. Connects at logic module on economizer.
4. Setting of power exhaust fan on logic module will activate pivoting of wheel after internal delay.
1. Remove jumper to install field optional low ambient switch.
2. Step-down transformer assembly for 460/575 volt units (only) connect between J50 and P50.
3. Matching adapter harness (provided) to connect with rooftop unit.
4. Optional low ambient switch.
5. Optional motorized intake damper.
6. Unit may be wired for HI, MED, or LO speeds. Diagram shows the HI speed setup, to rewire for MED or LO speed, disconnect BK-101 from relays and connect BL-101 for MED, or RD-101 for LO. Also connect WH-101 to BK-101.
7. Reposition enthalpy control into intake hood of ERS from rooftop unit economizer.
Notes:
1. Remove jumper to install field optional low ambient switch.
2. Step-down transformer assembly for 460/575 volt units (only) connect between J50 and P50.
3. Matching adapter harness (provided) to connect with rooftop unit.
4. Optional low ambient switch.
5. Optional motorized intake damper.
6. Unit may be wired for HI, MED, or LO speeds. Diagram shows the HI speed setup, to rewire for MED or LO speed, disconnect BK-101 from relays and connect BL-101 for MED, or RD-101 for LO. Also connect WH-101 to BK-101.
7. Reposition enthalpy control into intake hood of ERS from rooftop unit economizer.
Field Wiring Harness

LANDMARK (FIXED)

ERS Control Board

Note: Model (R06) use A134. All other models use A131.

ERS Harness Plug

P27  J4
  YEL-4° 1
      2
J153  P153
      3
GR-30 <1 RED-60°
      4
BK-30 <2 BLK-60°
      5
WT-30 <3
      6
      7
      8
      9
      10
      11
YEL-4°
      12
      13
      14
      15

Remove jumper to install optional low ambient switch.

Lennox Rooftop Unit
Notes:
1. Remove jumper to install field optional low ambient switch.
2. Step-down transformer assembly for 460/575 volt units.
3. Selective voltage terminal for proper unit voltage
4. Optional low ambient switch.
5. Optional motorized intake damper.
6. Unit may be wired for HI, MED, or LO speeds. Diagram shows the HI speed setup, to rewire for MED or LO speed, disconnect BK-101 from relays and connect BL-101 for MED, or RD-101 for LO. Also connect WH-101 to BK-101.
7. Optional stop, start and jog control.
8. Matching adapter harness (provided) to connect with rooftop unit. For energy management systems connect +24v to green and common 24v to black.
Notes:
1. Remove jumper to install field optional low ambient switch.
2. Step-down transformer assembly for 460/575 volt units.
3. Selective voltage terminal for proper unit voltage
4. Optional low ambient switch.
5. Optional motorized intake damper.
6. Unit may be wired for HI, MED, or LO speeds. Diagram shows the HI speed setup, to rewire for MED or LO speed, disconnect BK-101 from relays and connect BL-101 for MED, or RD-101 for LO. Also connect WH-101 to BK-101.
7. Optional stop, start and jog control.
8. Matching adapter harness (provided) to connect with rooftop unit. For energy management systems connect +24v to green and common 24v to black.
<table>
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<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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<td>575</td>
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</table>
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*__________

* 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 wb Temp*__________

* 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.