Installation Instructions for Energy Recovery Systems (ERS) Used With Lennox Energence 036-060 Series Units

**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
2. Outdoor Fresh Air Hood with Filter
3. Outdoor Exhaust Air Hood with Barometric Damper
4. ERS Support Rail
5. Adaptor Panel
6. Balancing Damper Assembly
7. Door Panel
8. Hardware Bag:
   - 14" Gasket ¾" x 1 ¼"
   - 7" Gasket ½" x ½"
   - 1 Field Harness
   - 4 Wire Ties
   - 12 Self-Tapping Screws 10-16 x ½"
   - 6 Mounting Screws 14-16 x ¾"
   - 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.

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**Illustration 1**

**Illustration 2**
**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 — 190 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 filter access door.
3. Remove the rooftop unit horizontal return air access panels. Also remove any hoods and/or power exhaust equipment. **If economizer is installed it MUST BE removed.** Discard hoods, power exhaust equipment, and horizontal return air 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.**
5. Slide in balancing damper over return duct opening. 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.

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

7. 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 8.

8. Verify the provided adaptor panel is secured to the new door panel. Also verify the platform support rail is secured to the adaptor panel. See Figure 9.

9. Install new door panel over balancing damper and secure.
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. Apply ¾” x 1 ¼” gasket to top and bottom decks of ERS as shown in the figure. See Figure 10.

3. Position ERS in front of new door panel installed in Step 10. 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. See Figure 11.

   Note: Equipment support kit or equivalent should be used under feet of standoff legs to prevent roof penetration. See Figure 12.

4. Set ERS on platform support rail slide ERS up against adaptor panel. The side flanges of adaptor panel should fit inside the posts of ERS. Secure ERS to adaptor panel using the provided 10-16 x ½” screws. See Figure 11.

5. Tuck the top flange of the ERS under the rooftop unit top panel and secure with the existing rooftop unit screws. See Figure 11.

7. 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 13.

8. 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 14 and Figure 15.
9. 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.

10. 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 16.

11. 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.

12. 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 17.

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)*

- **Yes**
  - Blower on & Lennox economizer ≥ min. position
    - ERS on
    - D01 = 1
    - D02 = 0

- **No**
  - ERS on
  - D01 = 0
  - D02 = 0

**Smoke Mode Operation**

<table>
<thead>
<tr>
<th>Smoke Mode Setting</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>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.

**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 on page 7. For location to take pressure readings. See Figure 18.

**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 & 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 between “R” (24v) and “G” to energize rooftop unit blower. Refer to manufacturers instructions when an electronic thermostat or other energy management system is used.

3. Restore power to ERS unit. The recovery wheel will rotate in the air stream, fresh air dampers will open, and the blowers will operate.

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.

**Energy Wheel Maintenance**
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 media and wash with water and/or mild detergent. Replace media by reversing the above procedure.
ENERGY RECOVERY SYSTEM

SCFM vs. PRESSURE DROP

Equation of line: SCFM = (PD)/0.0012

TABLE #1

<table>
<thead>
<tr>
<th>SCFM</th>
<th>PRESSURE DROP (in. of W.C.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>0.36</td>
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<tr>
<td>350</td>
<td>0.77</td>
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<tr>
<td>400</td>
<td>0.87</td>
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<tr>
<td>450</td>
<td>0.89</td>
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<tr>
<td>500</td>
<td>0.73</td>
</tr>
<tr>
<td>550</td>
<td>0.66</td>
</tr>
</tbody>
</table>

ERS Series, Blow Hi, Blow Lo
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 NEC/CEC CLASS I
<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>50R0649xH21</td>
<td>14”</td>
<td>300-550</td>
<td>208-230</td>
<td>1</td>
</tr>
<tr>
<td>50R0649xH23</td>
<td>14”</td>
<td>300-550</td>
<td>208-230</td>
<td>3</td>
</tr>
<tr>
<td>50R0649xH33</td>
<td>14”</td>
<td>300-550</td>
<td>460</td>
<td>3</td>
</tr>
<tr>
<td>50R0649xH43</td>
<td>14”</td>
<td>300-550</td>
<td>575</td>
<td>3</td>
</tr>
</tbody>
</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*__________
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.