



ENERGENCE KITS AND ACCESSORIES

R11A-49LDW

July 12, 2010
Supersedes 02-12-10

50R1149xH ENERGY RECOVERY SYSTEM

INSTALLATION INSTRUCTIONS FOR ENERGY RECOVERY SYSTEMS (ERS) USED WITH ENERGENCE 036-060 SERIES UNITS



Patent# 5,548,970

ETL Certified
per UL 1995
and CSA 22.2

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 - ERS Support Rail
- 1 - Adaptor Panel
- 1 - Balancing Damper Assembly
- 1 - Hardware Bag:
 - 20' - Gasket $\frac{3}{4}$ " x $1\frac{1}{4}$ "
 - 7' - Gasket $\frac{1}{8}$ " x $\frac{1}{2}$ "
 - 1 - Field Harness
 - 4 - Wire Ties
 - 12 - Self-Tapping Screws 10-16 x $\frac{1}{2}$ "
 - 8 - Gold Screws 10-16 x $\frac{1}{2}$ "
 - 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.

! 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.

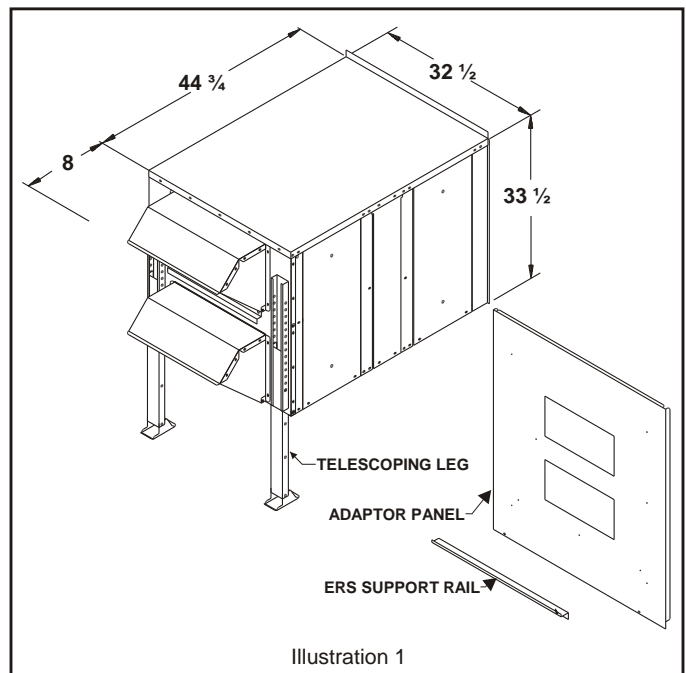


Illustration 1

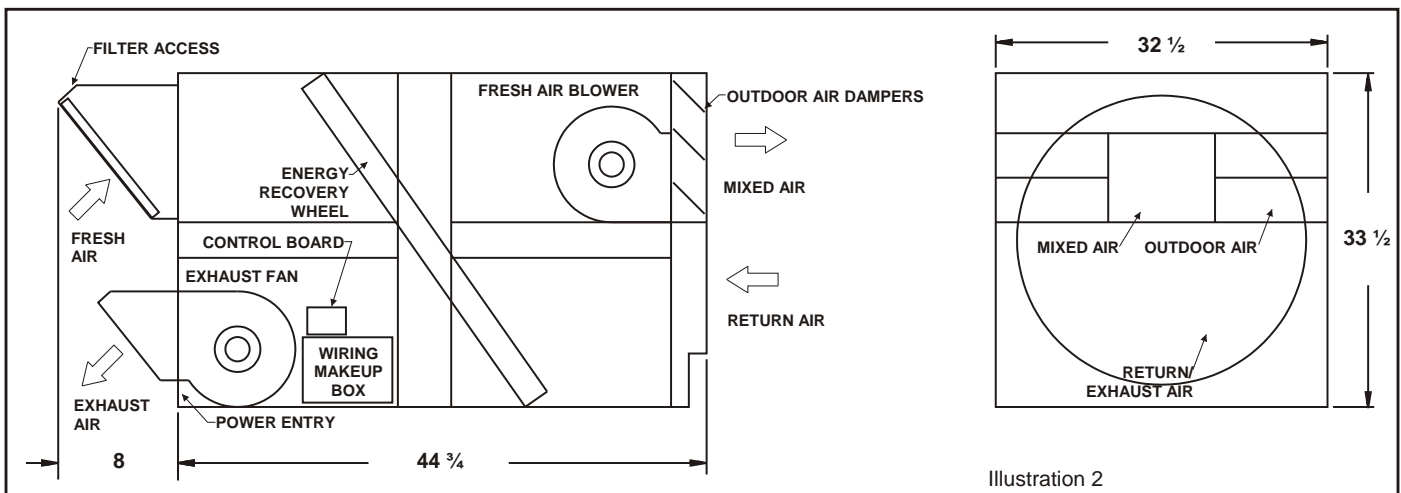


Illustration 2

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

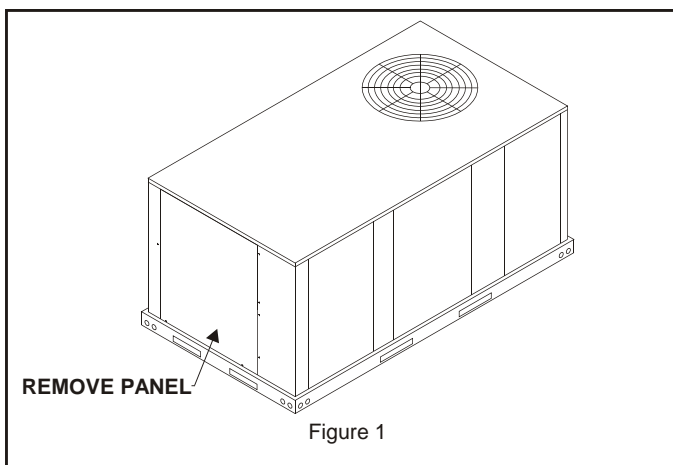
Check unit for shipping damage. Receiving party should contact last carrier immediately if shipping damage is found.

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 filter access door.
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.**



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.**

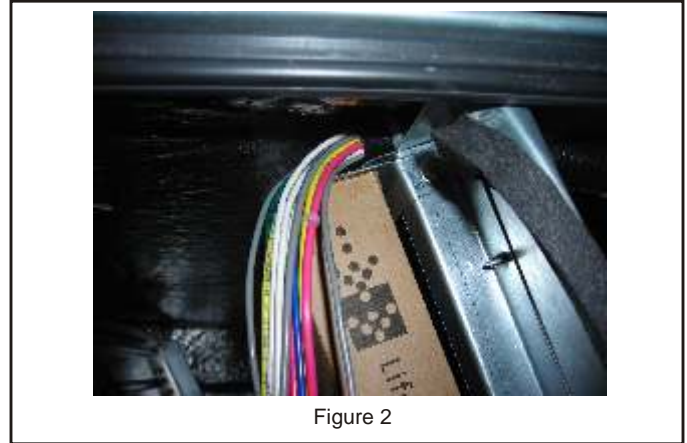


Figure 2

- C. Follow wires all the way through blower section. **See Figure 3.**

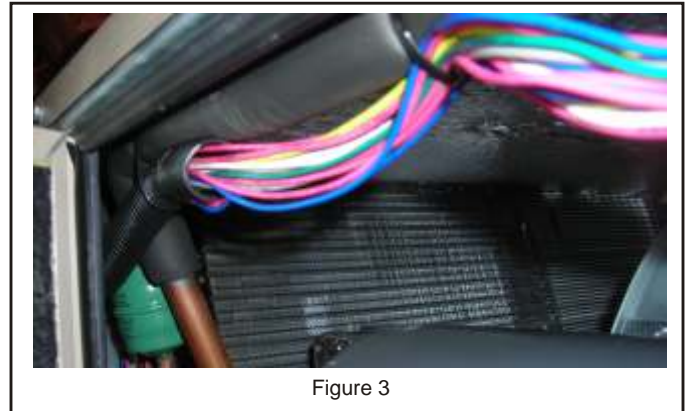


Figure 3

- D. Continue to follow wires along the top and through divider panel into the control center. **See Figure 4.**

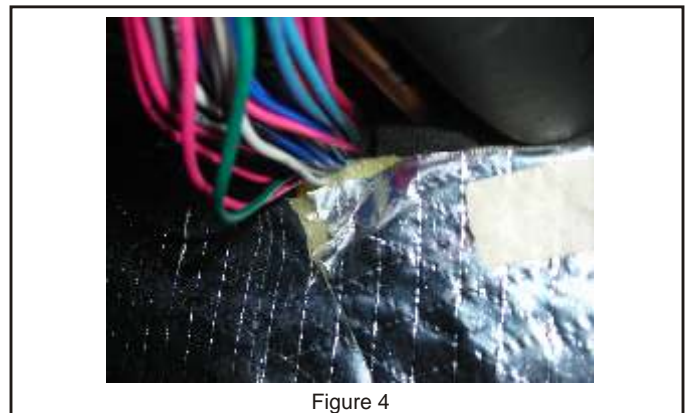


Figure 4

- 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.**

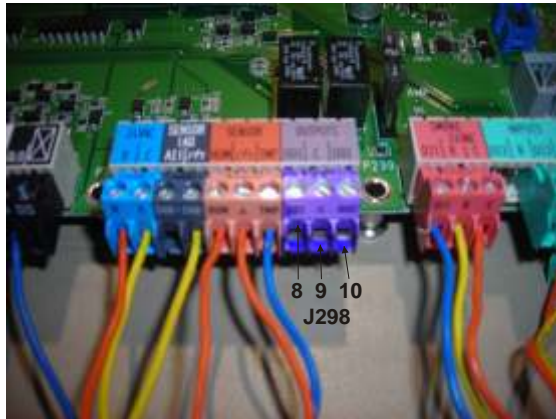


Figure 5

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.**



Figure 6



Figure 7

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



Figure 8

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

INSTALL ENERGY RECOVERY SYSTEM

1. Apply 3/4" x 1 1/4" gasket to top and bottom decks of ERS as shown in the figure. **See Figure 9.**

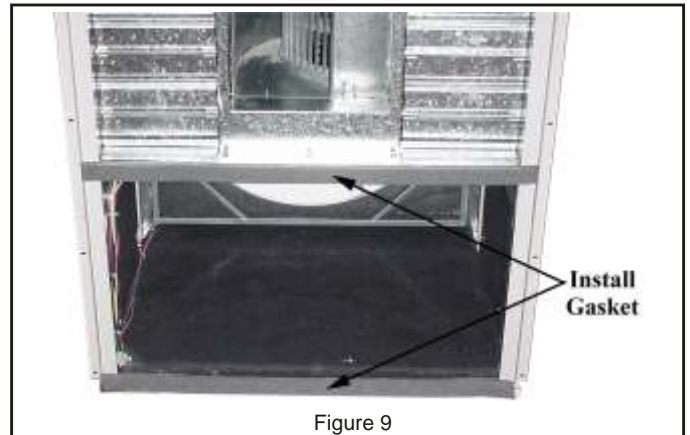


Figure 9

2. Install new adaptor panel over balancing damper and secure. **See Figure 10.**
3. Locate ERS support rail and install on the bottom of the return air opening of adaptor panel with flange pointing upward. **See Figure 10.**

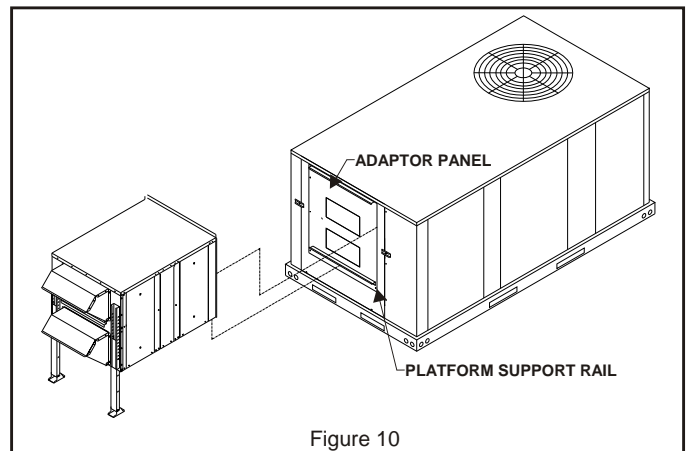


Figure 10

4. 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".
5. 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.
6. 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. See Figure 11.

7. Lower ERS onto ERS support rail catching the front edge of ERS bottom onto the 1/2" flange. Lift rear of ERS to rotate face against rooftop unit and secure with the existing rooftop unit screws and the providing 10-16 x 1/2" self-tapping screws. Tuck turned up flange on ERS top under top flange of rooftop unit. Secure into place. **See Figure 10.**
8. 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 11.**



Figure 11

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 12.**

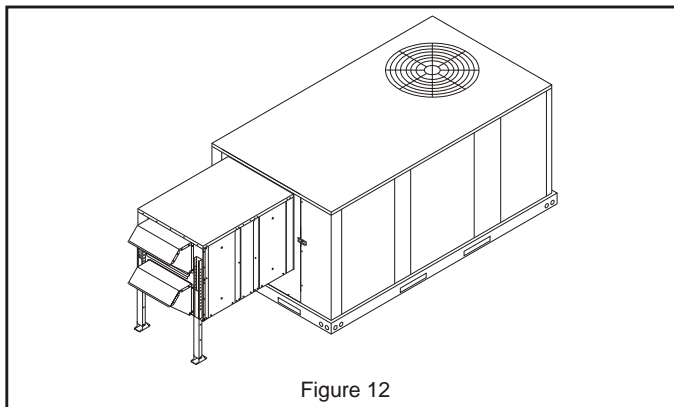


Figure 12

10. 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 13 and Figure 14.**

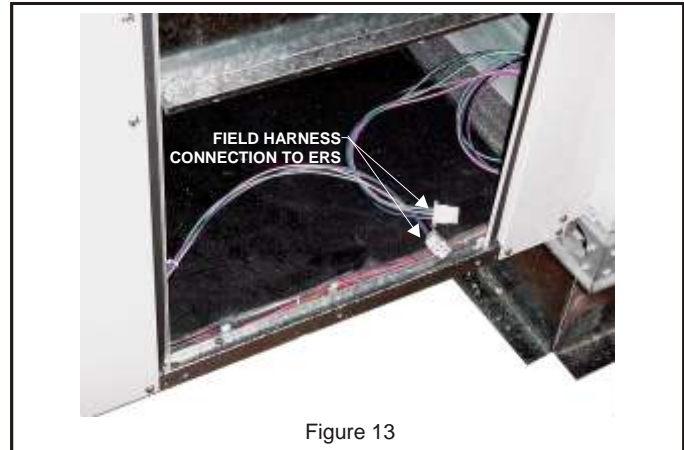


Figure 13

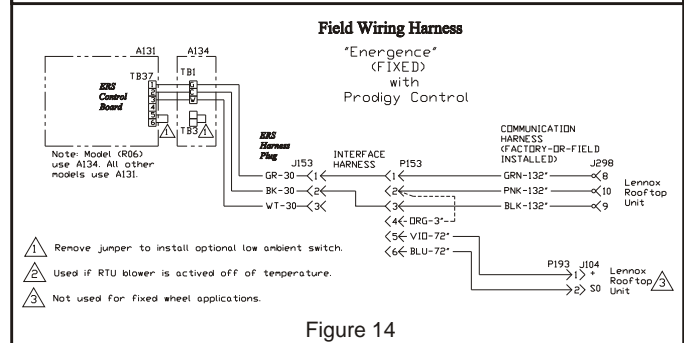


Figure 14

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 back panel to control box per the wiring diagram. **See Figure 15 and Figure 16.**



Figure 15

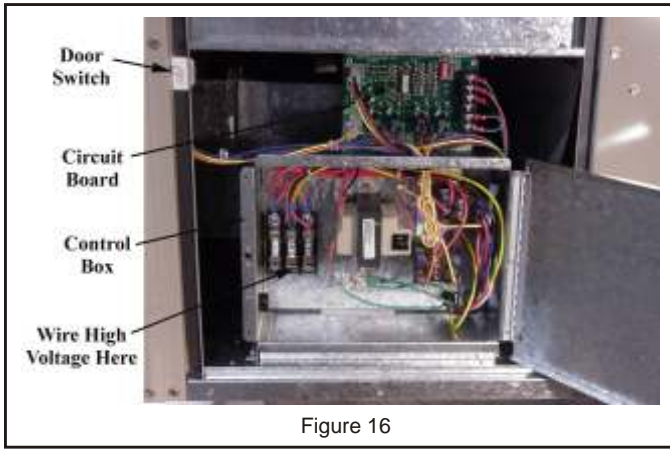


Figure 16

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 17.**

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

Smoke Mode Operation

| Smoke Mode Setting (ECTO 5.01) | Blower | D02 | Damper | D01 |
|--------------------------------|--------|-----|-----------|-----|
| 0, unit off (default) | OFF | OFF | Closed | OFF |
| 1, pos. pressure | ON | OFF | 100% Open | ON |

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.

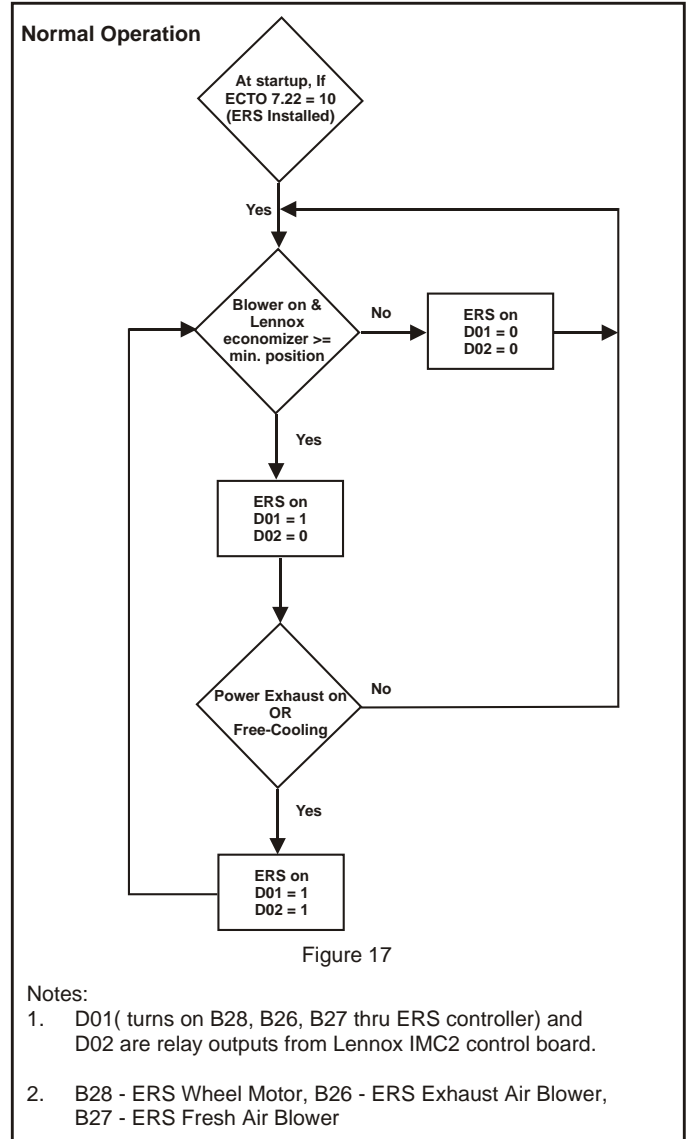


Figure 17

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

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.

| FROST THRESHOLD TEMPERATURE | |
|-----------------------------|-----------------------------|
| INDOOR RH AT 70°F | FROST THRESHOLD TEMPERATURE |
| 20% | 0°F |
| 30% | 5°F |
| 40% | 10°F |

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 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.**

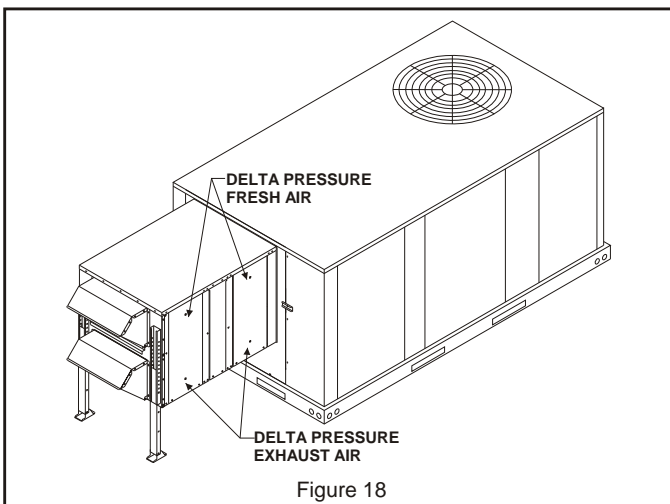


Figure 18

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 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. Disconnect main power to unit before making adjustment to balancing damper and/or ERS unit.
4. Remove all jumpers and replace ERS control access cover.
5. Set thermostat to normal operating position.
6. 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 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 19.** 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.

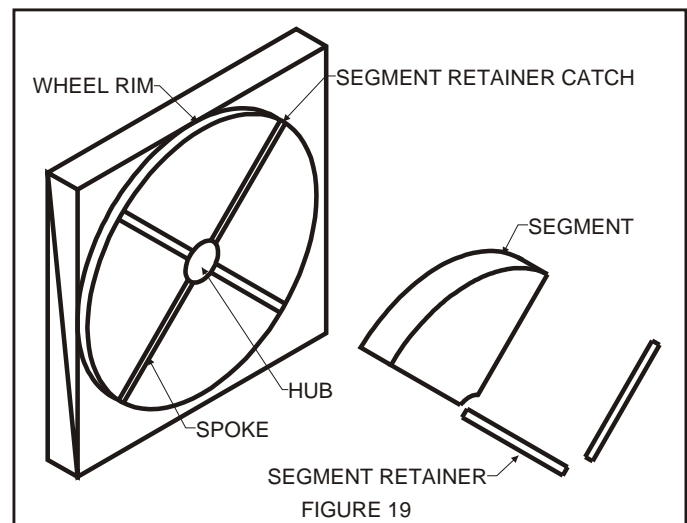
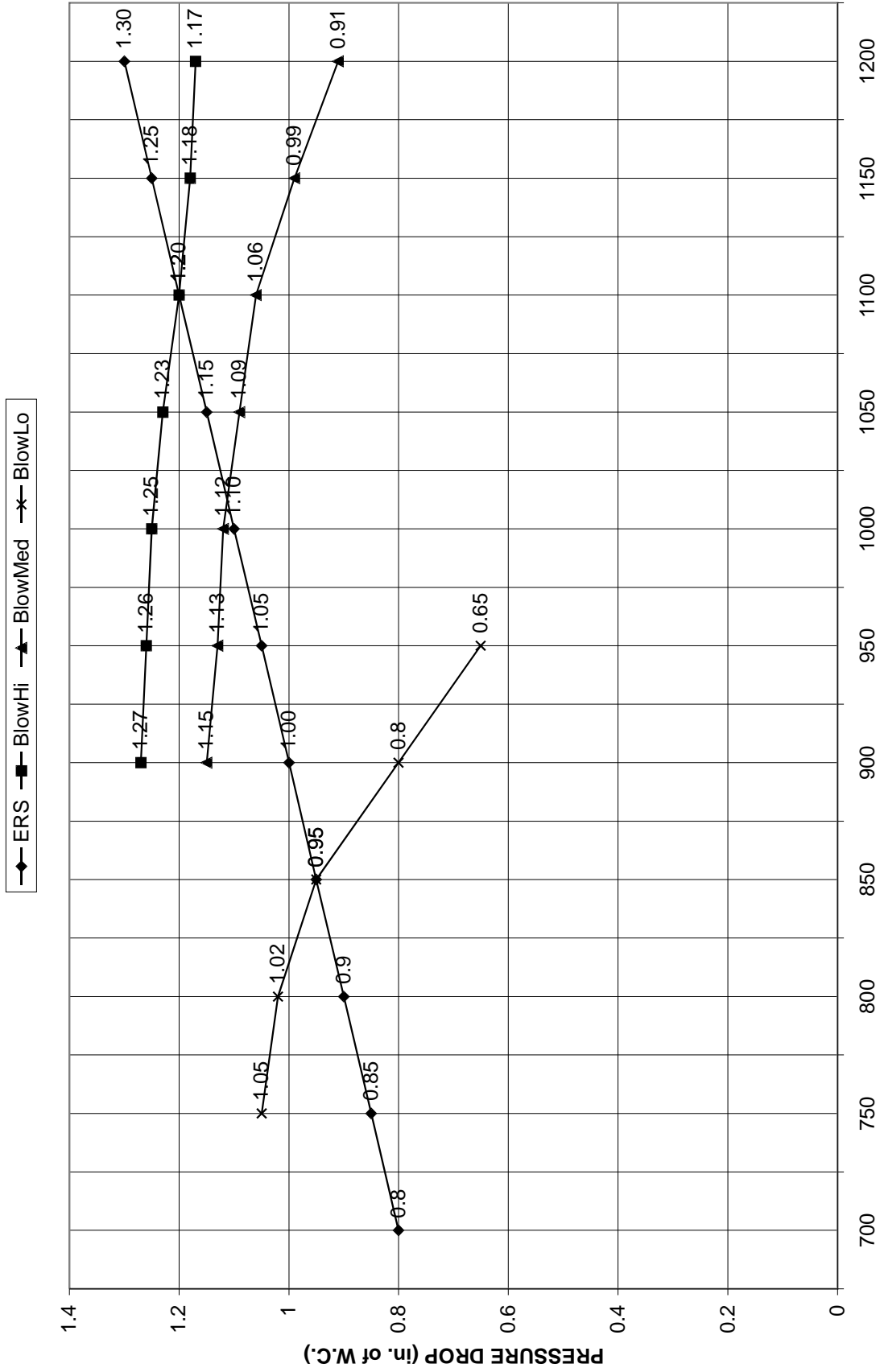


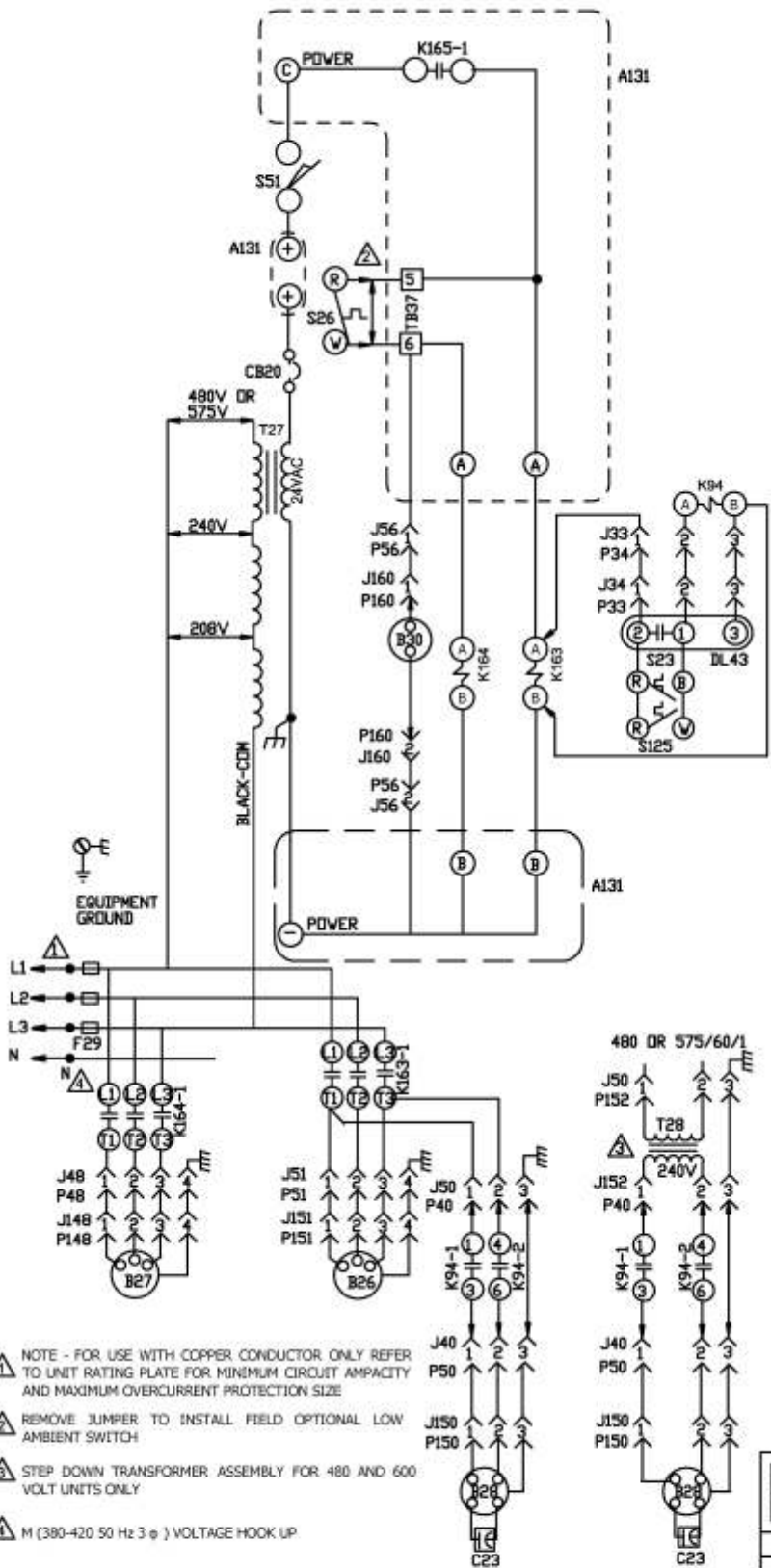
FIGURE 19

50R1149xH* Series

ENERGY RECOVERY SYSTEMS



Equation of Line: $SCFM = (PD - 0.0568182) / 0.0010455$
 TABLE#1



| KEY | DESCRIPTION |
|-----------|------------------------------------|
| A131 | CONTROL, FIXED WHEEL |
| B26 | MOTOR, EXHAUST AIR BLOWER |
| B27 | MOTOR, FRESH AIR BLOWER |
| B28 | MOTOR, DESSICAN WHEEL |
| B30 | MOTOR, DAMPER (OPTIONAL) |
| C23 | CAPACITOR, WHEEL MOTOR |
| CB20 | CIRCUIT BREAKER, DESSICAN WHEEL |
| DL43 | DELAY, CYCLE CONTROL |
| F29 | FUSE, DESSICANT WHEEL |
| J33 | JACK, CYCLE CONTROL |
| J34 | JACK, CYCLE CONTROL HARNESS |
| J40 | JACK, WHEEL CYCLE |
| J48 | JACK, MOTOR VARIABLE SPEED |
| J50 | JACK, TRANSFORMER |
| J51 | JACK, EXHAUST BLOWER |
| J56 | JACK, DAMPER MOTOR PCB |
| J148 | JACK, FRESH AIR BLOWER |
| J150 | JACK, WHEEL MOTOR |
| J151 | JACK, EXHAUST BLOWR MOTOR |
| J152 | 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 |
| P40 | PLUG, WHEEL CYCLE |
| P48 | PLUG, MOTOR 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 EXHAYUST BLOWER |
| P160 | PLUG, DAMPER MOTOR |
| S23 | SWITCH, LOW AMBIENT CUT IN |
| S26 | THERMOSTAT, AMBIENT |
| S51 | SWITCH, DODR INTERLOCK |
| S125 | SWITCH, AMBIENT OVERRIDE |
| T27 | TRANSFORMER, DESSICANT WHEEL |
| T28 | TRANSFORMER, STEP DOWN WHEEL MOTOR |

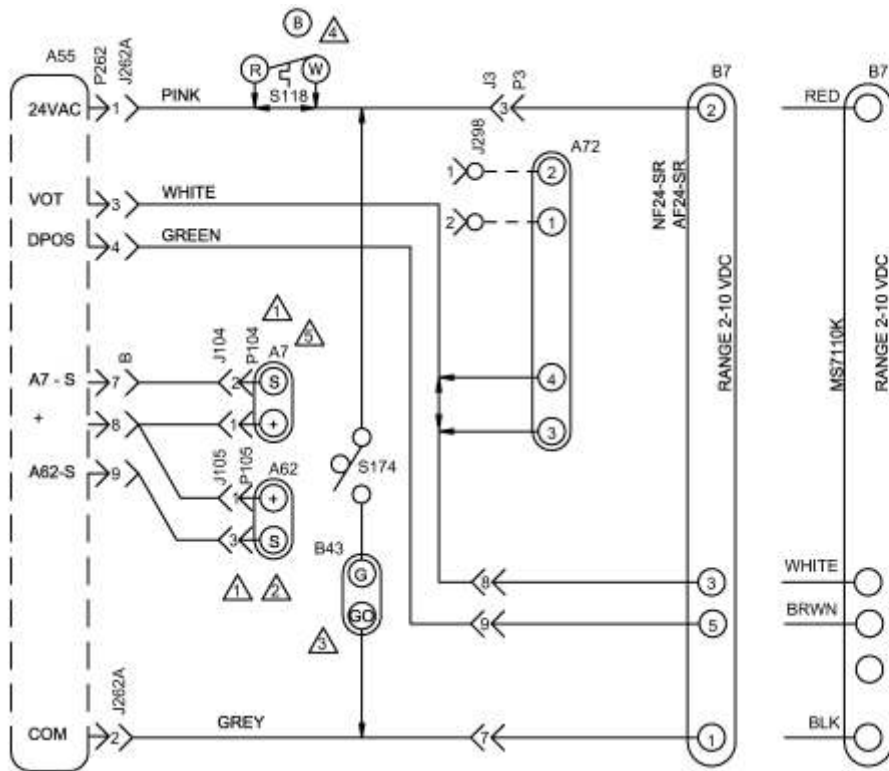
NOTE - IF ANY WIRE IN THIS APPLIANCE IS REPLACED IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING, TERMINATION AND INSULATION THICKNESS

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.

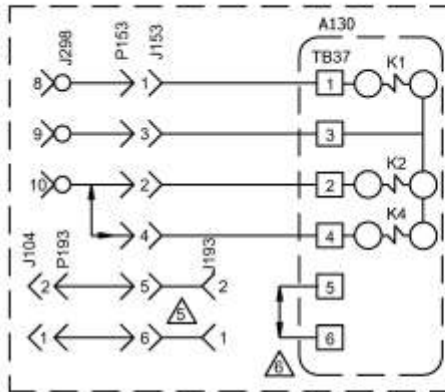
- ⚠ NOTE - FOR USE WITH COPPER CONDUCTOR ONLY REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE
- ⚠ REMOVE JUMPER TO INSTALL FIELD OPTIONAL LOW AMBIENT SWITCH
- ⚠ STEP DOWN TRANSFORMER ASSEMBLY FOR 480 AND 600 VOLT UNITS ONLY
- ⚠ M (380-420 50 Hz 3 ⌀) VOLTAGE HOOK UP

← DENOTES OPTIONAL COMPONENTS
 — LINE VOLTAGE FIELD INSTALLED NEC/CEC CLASS 1

| | | |
|--|------------------------|----------|
| | WIRING DIAGRAM | 02/10 |
| | ACCESSORIES | |
| FIXED ENERGY RECOVERY WHEEL FOR ENERGECE AND LANDMARK - G, J, M, Y | | |
| SECTION F | | REV. 1.0 |
| Supersedes | New Form No. 537330-01 | |



| KEY | DESCRIPTION | COMPONENT |
|-------|----------------------------------|-----------|
| A7 | SENSOR, SOLID STATE ENTHALPY | |
| A130 | CONTROL, ERS | |
| A55 | CONTROL, MAIN PANEL LENNOX | |
| A62 | SENSOR, ENTHALPY INDOOR | |
| A72 | CONTROL, REMOTE MIN POS (OPT) | |
| B7 | MOTOR, DAMPER ECONOMIZER | |
| B43 | MOTOR, EXHAUST DAMPER | |
| J3 | JACK, UNIT ECONOMIZER | |
| J104 | JACK, SENSOR OUTDOOR ENTHALPY | |
| J105 | JACK, SENSOR RETURN AIR ENTHALPY | |
| J153 | JACK, ENTHALPY / DAMPER MOTOR | |
| J193 | JACK, ENTHALPY SENSOR | |
| J298A | JACK, IAQ INTERFACE | |
| J262A | JACK, DAMPER MOTOR | |
| J262B | JACK, ENTHALPY SENSORS | |
| P3 | PLUG, ECONOMIZER BYPASS | |
| P153 | PLUG, ENTHALPY / DAMPER MOTOR | |
| P193 | PLUG, ENTHALPY SENSOR | |
| P262 | PLUG, ECONOMIZER OUTPUT | |
| S118 | THERMOSTAT, DESICANT DEFROST | |
| S174 | SWITCH, EXHAUST DAMPER | |



ENERGY RECOVERY WHEEL HOOK UP

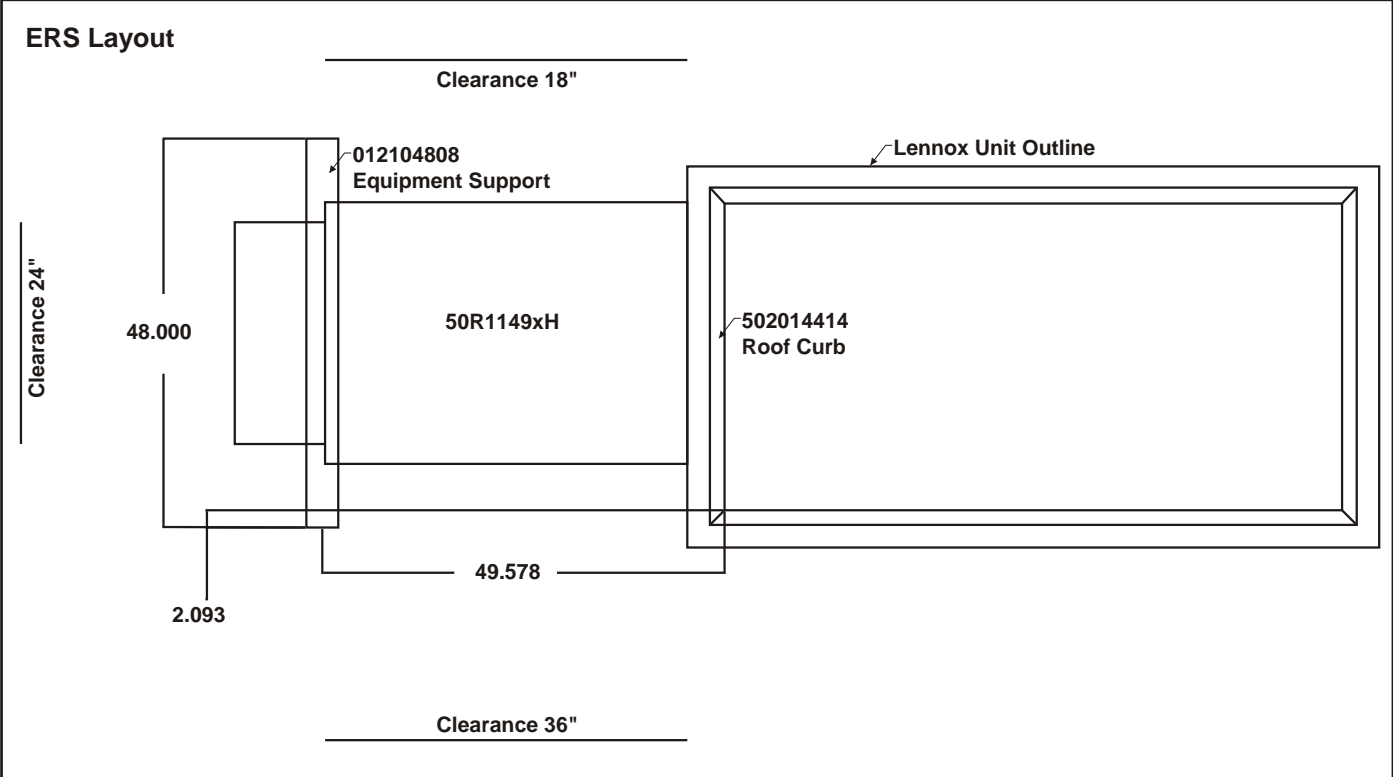
- ⚠️ DELETE A7 AND A62 (IF USED) FOR EITHER GLOBAL ENTHALPY OR SENSIBLE TEMPERATURE CONTROL
- ⚠️ FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR
- ⚠️ OPTIONAL EXHAUST DAMPER ACTUATOR TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED
- ⚠️ S118 USED ON 35 TO 50 TON EMERGENCY UNITS WITH ENERGY RECOVERY WHEEL (ERW)
- ⚠️ REPOSITION A7 ENTHALPY SENSOR FROM ROOFTOP UNIT ECONOMIZER 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

| | | |
|--|--------------|-------------------|
| WIRING DIAGRAM | | 09/09 |
| ACCESSORIES | | |
| EMERGENCY SERIES ECONOMIZER AND MOTORIZED OAD PIVOTING WHEEL ENERGY RECOVERY SYSTEM OPTION | | |
| SECTION D | | |
| Supersedes | New Form No. | |
| | 537189-01 | |
| © 2009 | | Lennox Commercial |

| Lennox Model No. | Req'd Curb Height | CFM Range | Voltage | Phase |
|------------------|-------------------|-----------|---------|-------|
| 50R1149xH21 | 14" | 700-1000 | 208-230 | 1 |
| 50R1149xH23 | 14" | 700-1000 | 208-230 | 3 |
| 50R1149xH33 | 14" | 700-1000 | 460 | 3 |
| 50R1149xH43 | 14" | 700-1000 | 575 | 3 |



START UP INFORMATION SHEET

VOLTAGE - ERS UNIT

Incoming Voltage L1-L2 _____ L1-L3 _____ L2-L3 _____
Running Voltage L1-L2 _____ L 1-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 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.