



LANDMARK KITS AND ACCESSORIES

R06AL-45LDW

February 16, 2010

50R0645xH ENERGY RECOVERY SYSTEM

INSTALLATION INSTRUCTIONS FOR ENERGY RECOVERY SYSTEMS USED WITH LENNOX LANDMARK 036-060 SERIES UNITS



Energy recovery COMPONENT certified to the AHRI Air-to-Air Energy Recovery Ventilation Equipment Certification Program in accordance with AHRI Standard 1060-2000. Actual performance in packaged equipment may vary.



ETL Certified per UL 1995 and CSA 22.2

SHIPPING AND PACKING LIST

Package 1 of 1 contains: **See Illustration 1 and 2.**

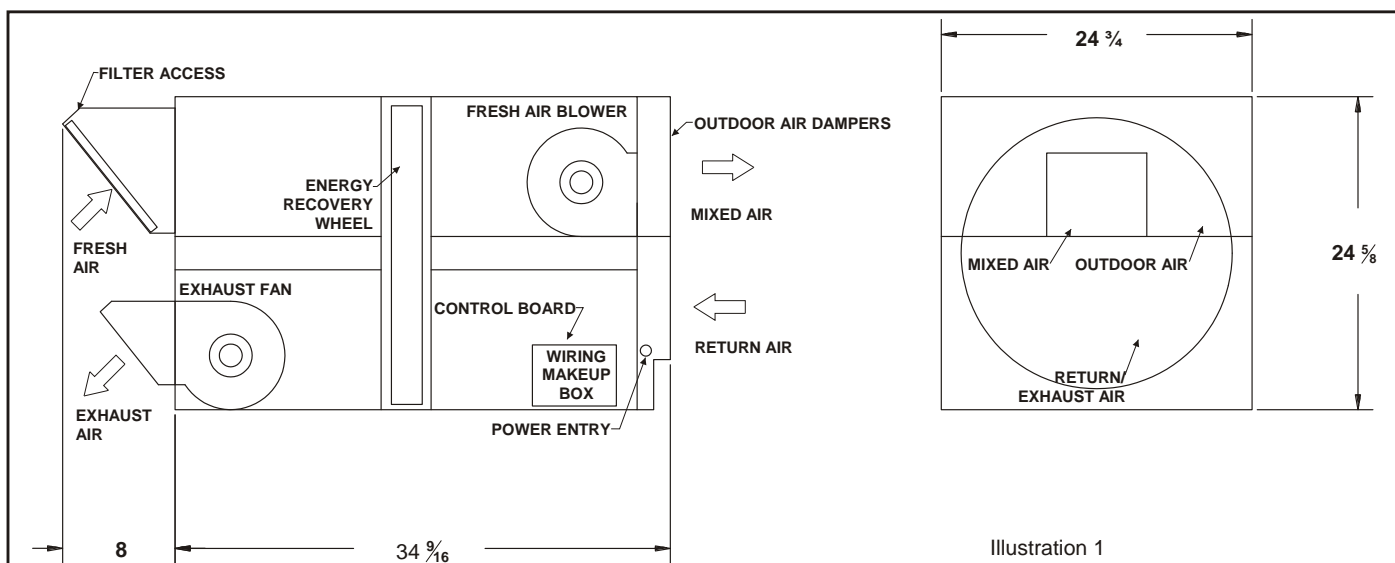
- 1 - Energy Recovery Ventilator Assembly
- 1 - Outdoor Fresh Air Hood with Filter
- 1 - Outdoor Exhaust Air Hood with Barometric Damper
- 1 - ERS Support Rail
- 1 - Adaptor Panel
- 1 - Balancing Damper Assembly
- 1 - Door Panel
- 1 - Hardware Bag:
 - 14' - Gasket $\frac{3}{4}$ " x $1\frac{1}{4}$ "
 - 7' - Gasket $\frac{1}{8}$ " x $\frac{1}{2}$ "
 - 1 - Field Harness
 - 4 - Wire Ties
 - 12 - Self-Tapping Screws 10-16 x $\frac{1}{2}$ "
 - 6 - Mounting Screws 14-16 x $\frac{3}{4}$ "
 - 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.



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 — 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. 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 2.** Loosen wing nut on adjustable quadrant, rotate arm to set blades to 50% open and retighten wing nut. **See Figure 3.**
5. Plug field harness P27 into economizer plug J4. **See Page 7** for field wiring.
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 4.**

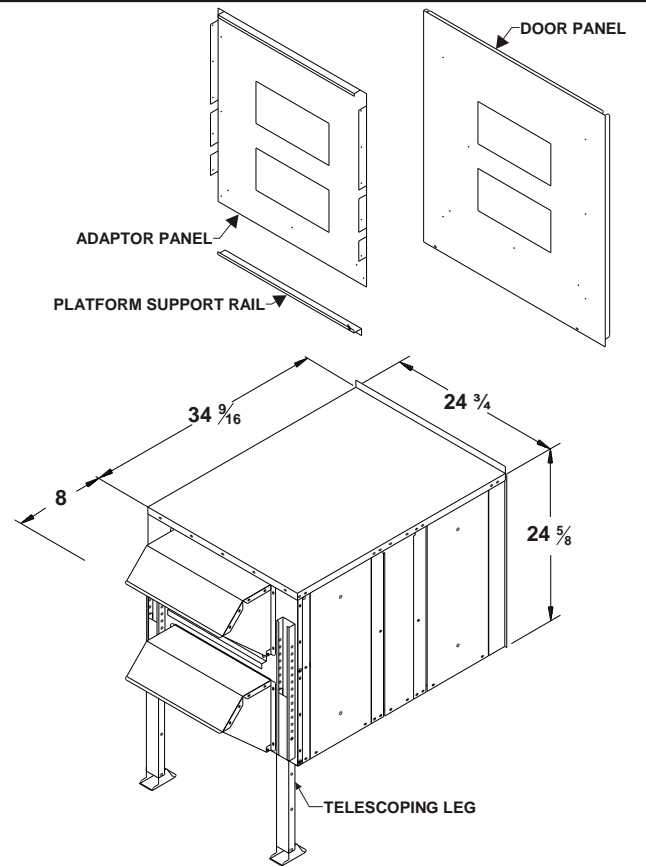


Illustration 2

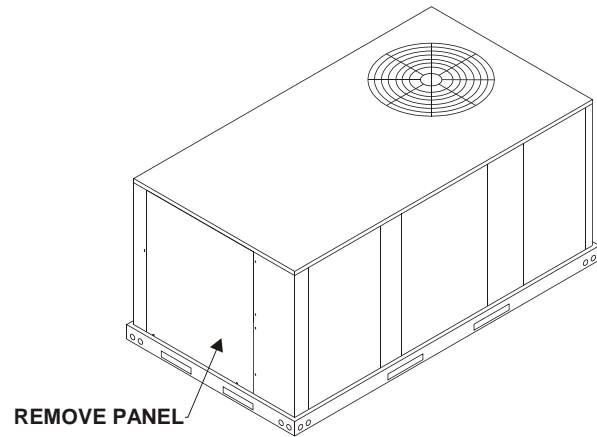


Figure 1



Figure 2

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 5.**
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 $\frac{3}{4}$ " x $1\frac{1}{4}$ " gasket to top and bottom decks of ERS as shown in the figure. **See Figure 6.**
3. 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.

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 $\frac{1}{2}$ " screws. **See Figure 7.**
5. Tuck the top flange of the ERS under the rooftop unit top panel and secure with the existing rooftop unit screws. **See Figure 7.**
6. 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.**
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 11.**
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 9.**
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 10.**



Figure 3



Figure 4

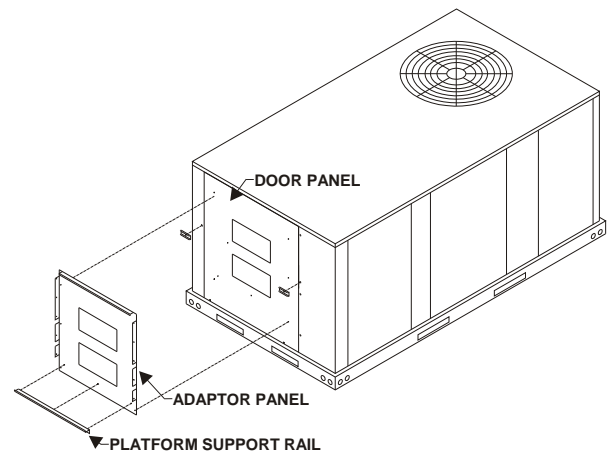


Figure 5

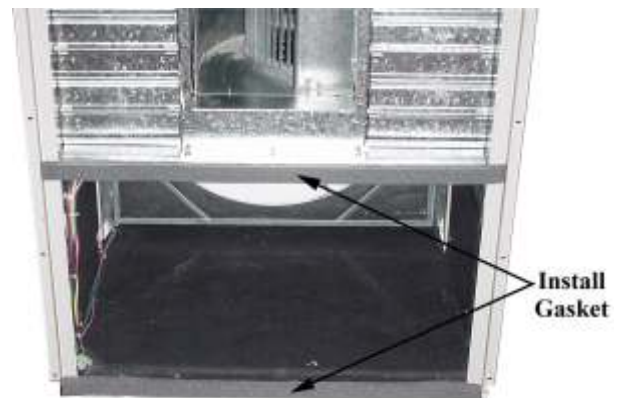


Figure 6

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.

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.

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.** For location to take pressure readings. **See Figure 11.**

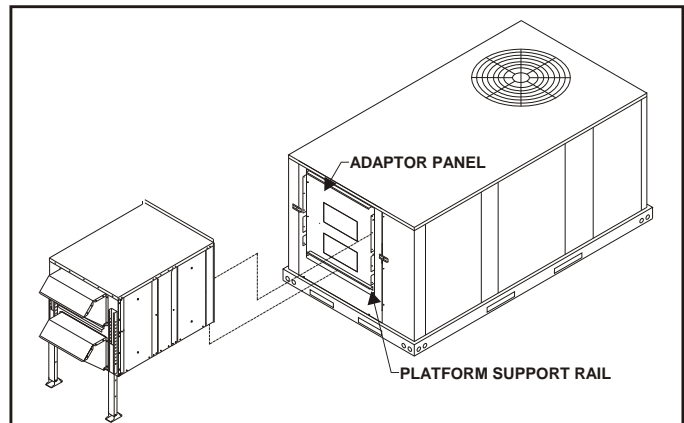


Figure 7



Figure 8

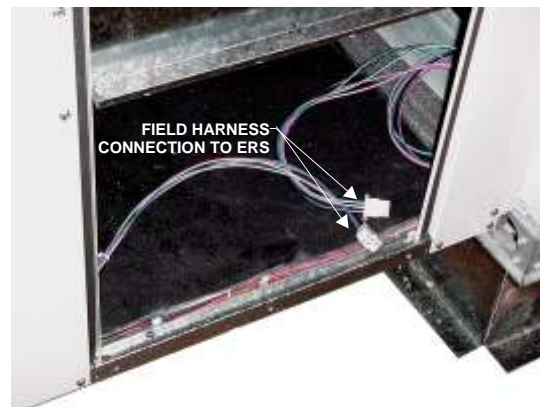


Figure 9

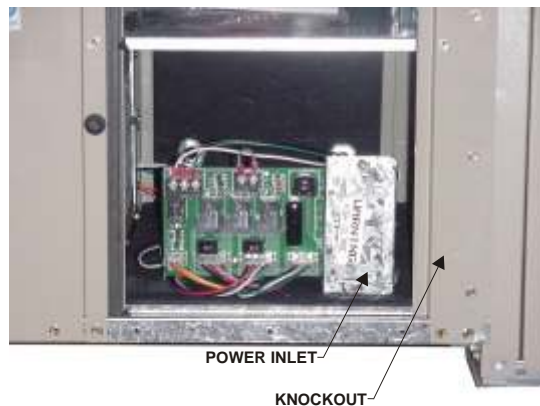


Figure 10

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.

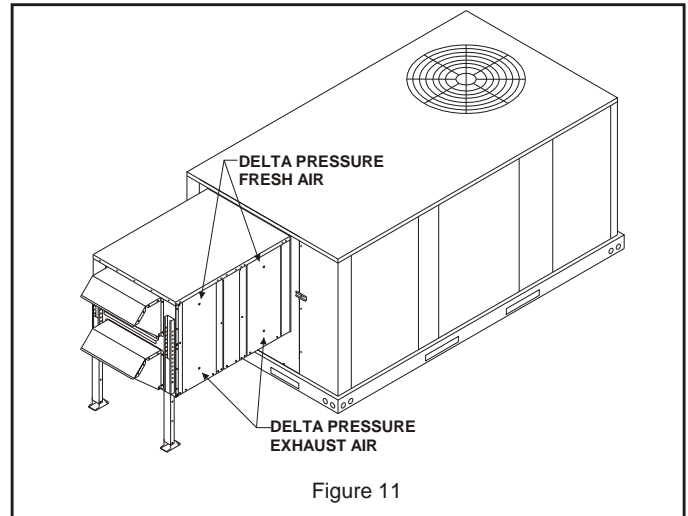
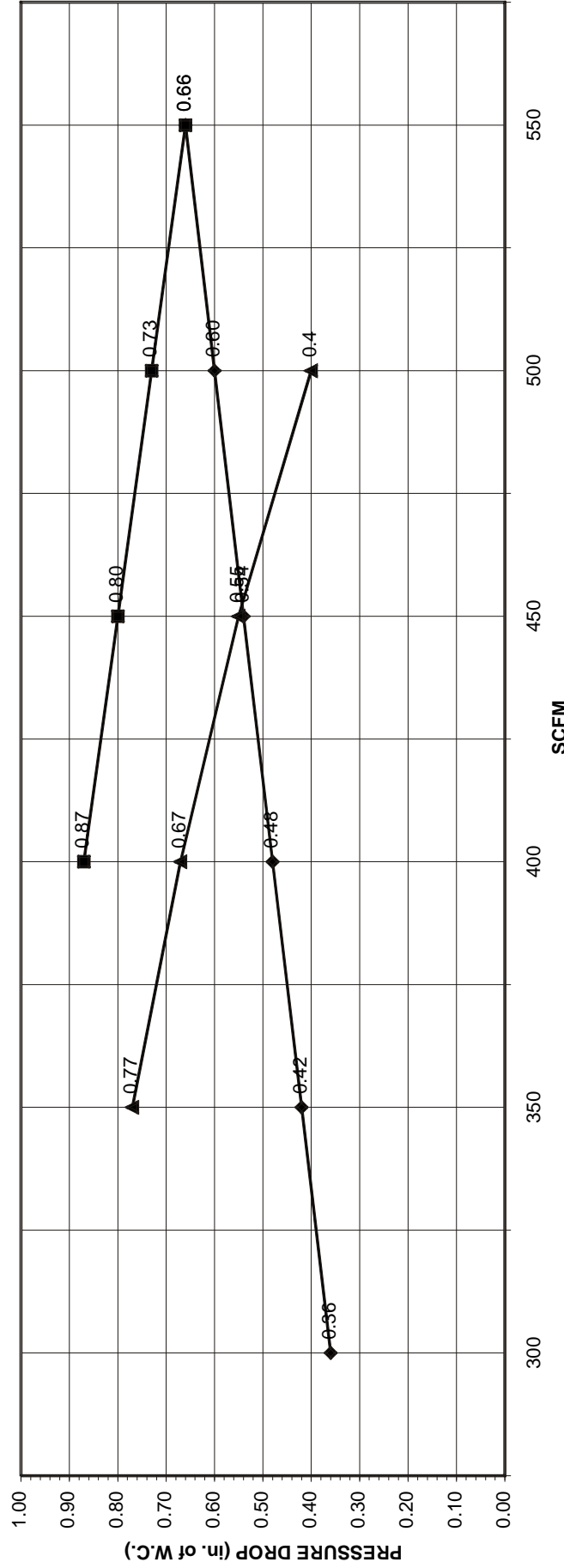


Figure 11

50R0645xH Series

ENERGY RECOVERY SYSTEM
SCFM vs. PRESSURE DROP

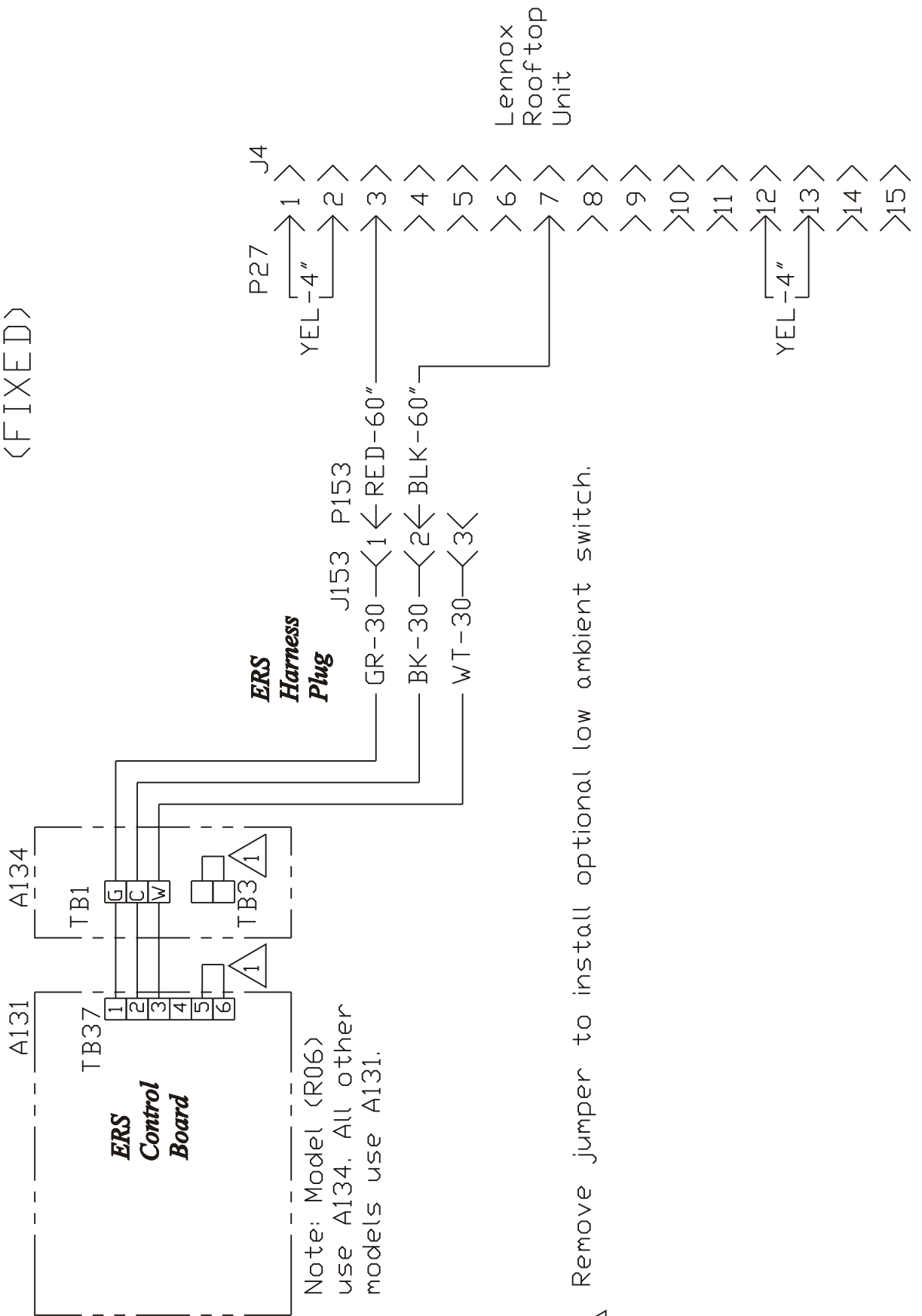
◆ ERS Series ■ Blow Hi ▲ Blow Lo



Equation of line: $SCFM = (PD) / 0.0012$
TABLE #1

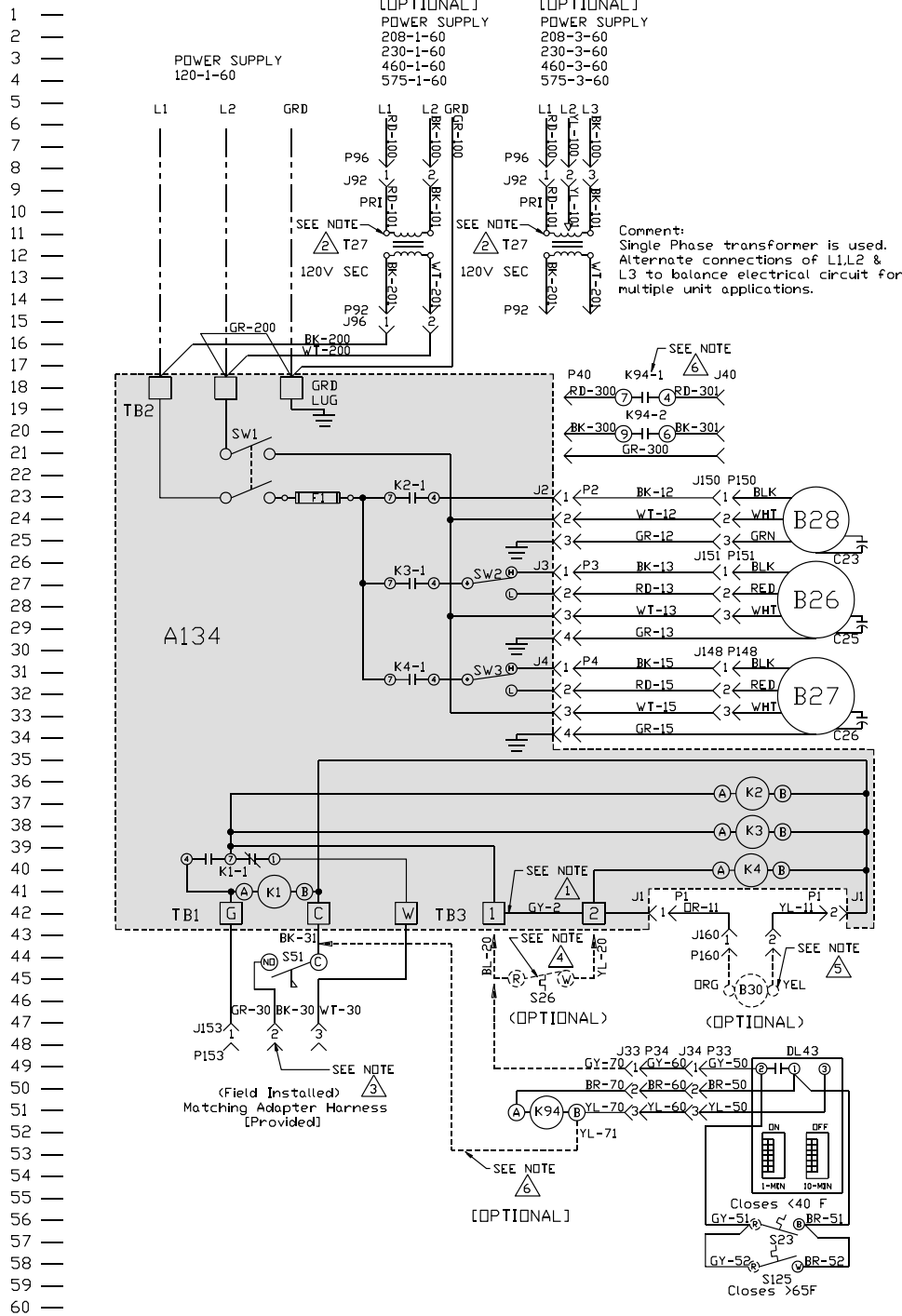
Field Wiring Harness

LANDMARK
(FIXED)



Remove jumper to install optional low ambient switch.

ERS UNIT SCHEMATIC DIAGRAM



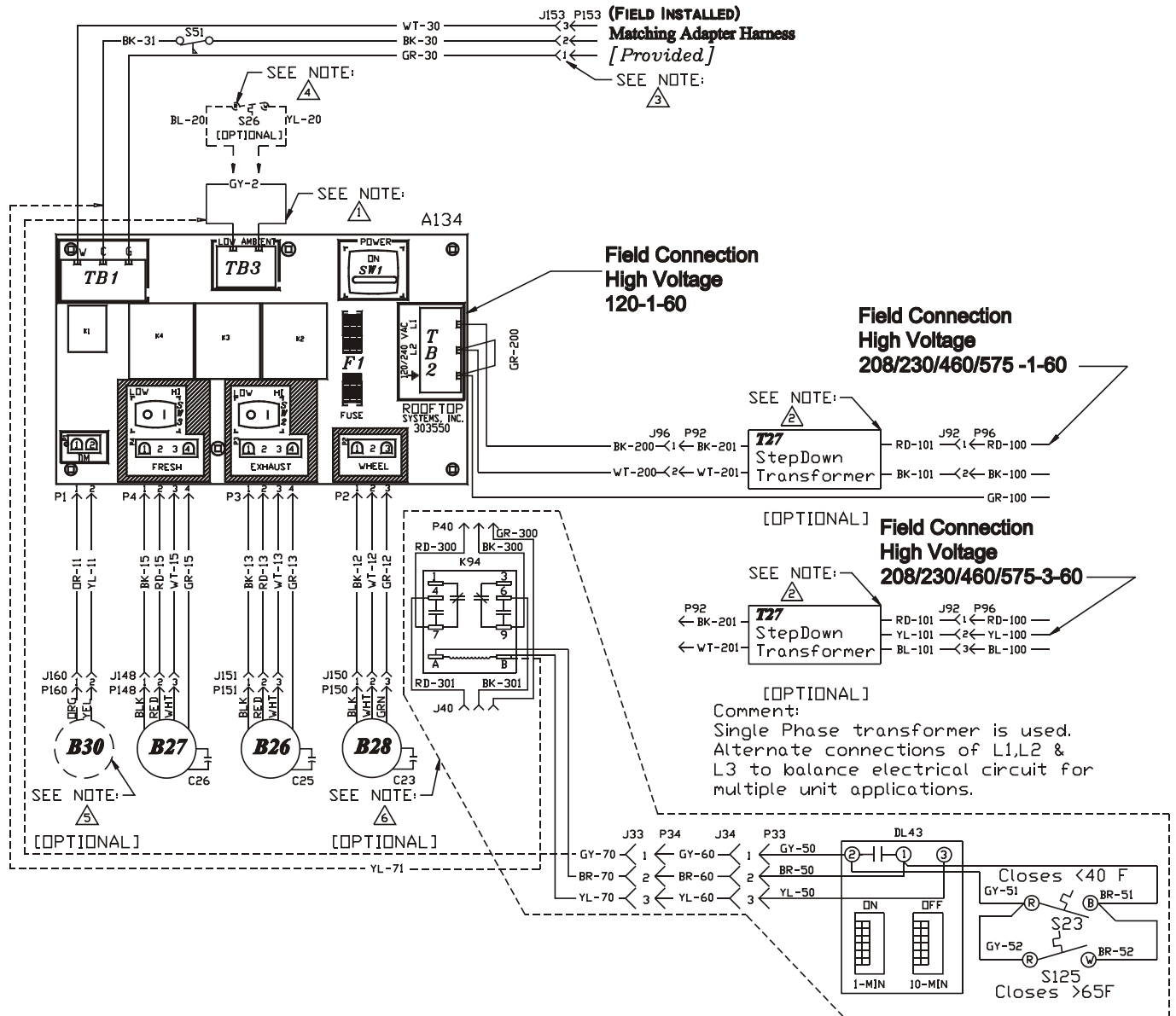
COMPONENT CODE	
A134	Fixed Relay Board
B26	Motor, Exhaust Air
B27	Motor, Fresh Air
B28	Motor, Desiccant Wheel
B30	Motor, Damper (Optional)
C23	Capacitor, Wheel Motor
C25	Capacitor, Motor Exhaust Air
C26	Capacitor, Motor Fresh Air
DL43	Delay, Cycle Timer (Optional)
F1	Fuse
J33	Jack, Cycle Control (Optional)
J34	Jack, Cycle Control Harness (Optional)
J40	Jack - Wheel Cycle (Optional)
J92	Jack - Transformer
J96	Jack - Power Interface
J148	Jack, Fresh Air Motor Harness
J150	Jack, Wheel Motor Harness
J151	Jack, Exhaust Air Motor Harness
J153	Jack, Field Harness
J160	Jack, Damper Motor
K94	Relay - On/Off (Optional)
P1	Plug, P.C. Board (Damper Motor)
P2	Plug, P.C. Board (Wheel)
P3	Plug, P.C. Board (Exhaust)
P4	Plug, P.C. Board (Fresh)
P33	Plug, Cycle Control (Optional)
P34	Plug, Cycle Control Harness (Optional)
P40	Plug, Wheel Cycle (Optional)
P92	Plug, Transformer
P96	Plug, Power Interface
P148	Plug, Fresh Air Motor
P150	Plug, Wheel Motor
P151	Plug, Exhaust Air Motor
P153	Plug, Field Harness
P160	Plug, Damper Motor
S23	Thermostat, Low Ambient (Optional)
S26	Switch, Low Ambient (Optional)
S51	Switch, Door
S125	Switch, Ambient Override (Optional)
SW1	Switch, Power
SW2	Switch, Speed Change (Exhaust)
SW3	Switch, Speed Change (Fresh)
T27	Transformer, Step-down (Optional)
TB1	Terminal Block (Low Voltage)
TB2	Terminal Block (High Voltage)
TB3	Terminal Block (Low Ambient)

WIRE COLOR CODE	
BK	Black
BL	Blue
GR	Green
OR	Orange
RD	Red
WH	White
YL	Yellow

Notes:

1. Remove jumper to install field optional low ambient switch.
2. Step-down transformer assembly for 208-230/460/575 volt units.
3. Matching adapter harness (provided) to connect with rooftop unit. For energy management systems connect +24v to green and common 24v to black.
4. Optional low ambient switch.
5. Optional motorized intake damper.
6. Optional stop, start and jog control.

ERS UNIT WIRING DIAGRAM



Notes:

1. Remove jumper to install field optional low ambient switch.
2. Step-down transformer assembly for 208-230/460/575 volt units.
3. Matching adapter harness (provided) to connect with rooftop unit. For energy management systems connect +24v to green and common 24v to black.
4. Optional low ambient switch.
5. Optional motorized intake damper.
6. Optional stop, start and jog control.

Desiccant Wheel for Rooftop Unit
208-230/460V/575V (3 PH)

Unit#: 01-R0601XX-23/-33/-43

Lennox Model No.	Req'd Curb Height	CFM Range	Voltage	Phase
50R0645xH21	14"	300-550	208-230	1
50R0645xH23	14"	300-550	208-230	3
50R0645xH33	14"	300-550	460	3
50R0645xH43	14"	300-550	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 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.