



L SERIES KITS AND ACCESSORIES

P20A-31LDW
506353-01 (Replaces 504,689M)
June 19, 2009
Supersedes 04-29-09

50(R/P)2031xH ENERGY RECOVERY SYSTEM

INSTALLATION INSTRUCTIONS FOR ENERGY RECOVERY SYSTEMS USED WITH "L" SERIES 090-150 UNITS

Patent# 5,548,970



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 System Assembly
- 1 - Outdoor Fresh Air Hood with Filter
- 1 - Outdoor Exhaust Air Hood with Barometric Damper
- 1 - Bottom Adapter Panel
- 1 - Balancing Damper Assembly (**Fixed Only**)
- 1 - LD Shield (**Fixed Only**)
- 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
 - 1 - Jumper Harness
 - 1 - J3-3 Extension Wire
 - 1 - Tilt Switch Assembly (**Pivoting Only**)
 - 4 - Wire Ties
 - 6 - Mounting Screw(s) #14-16 x $\frac{3}{4}$ "
 - 15 - Self-tapping Screw(s) 10-16 x $\frac{1}{2}$ "
 - 8 - Gold Screw(s) 10-16 x $\frac{1}{2}$ "
 - 1 - Installation Instruction
 - 2 - Wiring Stickers

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.

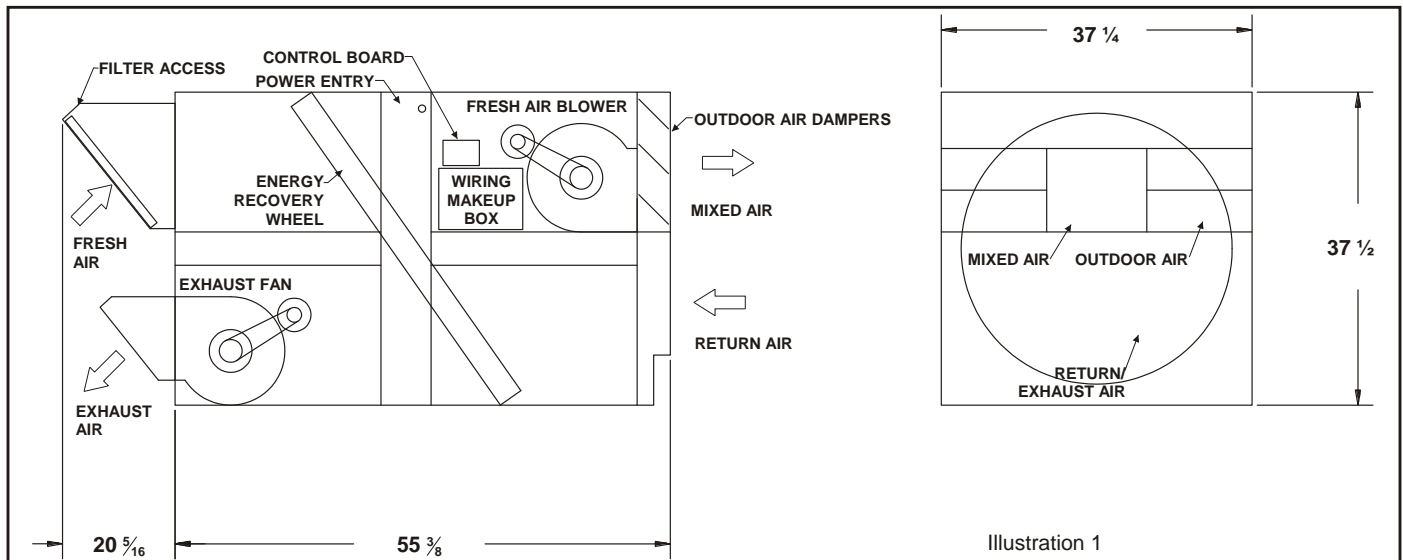


Illustration 1

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

Note: The ERS unit is equipped with a support block that must be removed to allow the unit to change operating modes. This block may cause damage to system if not removed. See Figure 15.

1. Disconnect all power to rooftop unit.
2. Open rooftop unit filter access door. If installing pivoting wheel verify and/or install 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 9

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 plug P104, remove screws securing the sensor, and retain sensor assembly and screws. Push sensor jack J104 through economizer support wall. See Figure 2.
5. Disconnect plug P3 from connector J3. See Figure 3.
6. Install the provided ERS field harness between J3 and P3 by plugging P27 into J3, plugging J27 into P3 harness. See Page 10.

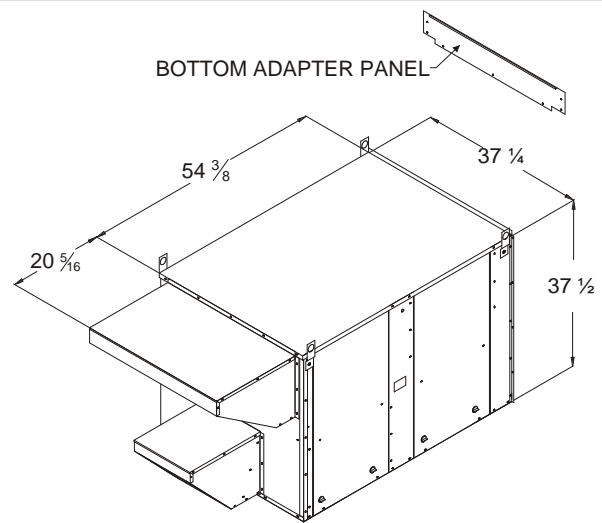


Illustration 2

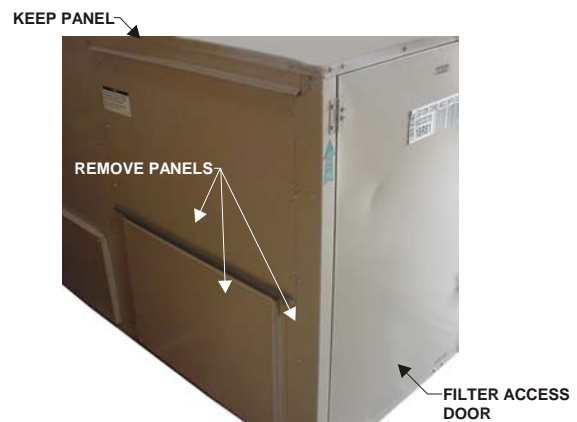


Figure 1

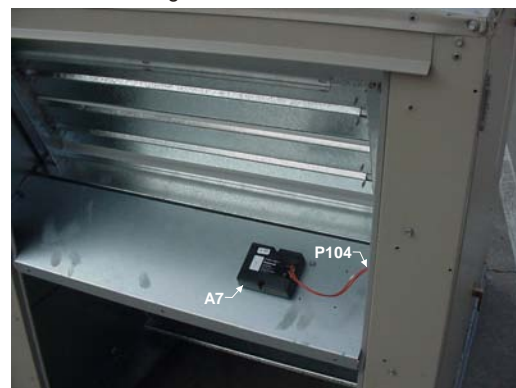


Figure 2

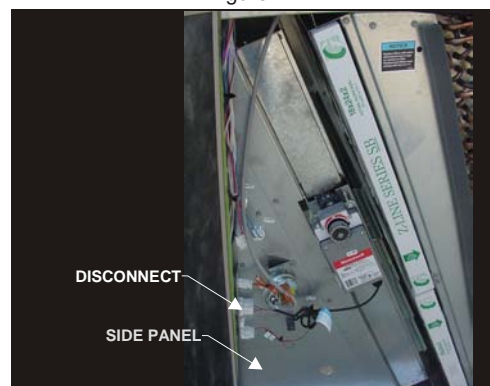


Figure 3

7. Plug P193 from ERS field harness into J104, the plug previously pushed through the wall. Also plug P18 into J18 at side panel.
8. Locate the provided night set back "tilt switch" assembly (S168). Install this switch assembly to economizer damper assembly. Mount on the lower outside air damper blade, above the center "V" bend using provided self drilling screws. Position the switch as indicated in **Figure 5**. The tilt switch is to indicate when the outside air damper is in the closed position. The little can has a ball inside it. When you tip the end of the switch toward the leads downward, the ball rolls back toward the leads and makes contact. Tilting the end of the switch away from the leads down, causes the ball to roll back breaking the contact. The terminal strip provides a mean of mounting the tilt switch and a means of securing the switch assembly. Damper rotation trips the switch to determine ERS has a control signal to start.

If installing pivoting wheel skip to step 11

9. Open filter access door and 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**. After assembly is in place attach the LD shield to the side panel, thus securing the balancing damper from sliding out of position. Loosen wing nut on adjustable quadrant, rotate arm to set blades to 50% open and retighten wing nut. **See Figure 6**.
10. Plug field harness P27 into economizer plug J3. **See Page 10** for field wiring.
11. Using wire ties neatly route the wires to clear any moving parts.
12. Route the 6-pin (pivoting) / 3-pin (fixed) 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**.
13. Apply $\frac{3}{4}$ " x $1\frac{1}{4}$ " gasket to top and bottom decks of ERS as shown in the figure. **See Figure 8**.
14. Locate bottom adapter panel and install on the bottom of the return air opening of rooftop unit using 14-16 x $\frac{3}{4}$ " mounting screws. **See Figure 9**.
15. Remove all screws holding the top panel of rooftop unit around the horizontal exhaust air opening. Ensure that the top and upper most return air opening 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. Apply $\frac{1}{8}$ " x $\frac{1}{2}$ " gasket around perimeter to ensure seal to ERS.
3. Lower ERS into bottom adapter panel catching the front edge of the ERS bottom into the $\frac{1}{2}$ " flange. Tuck

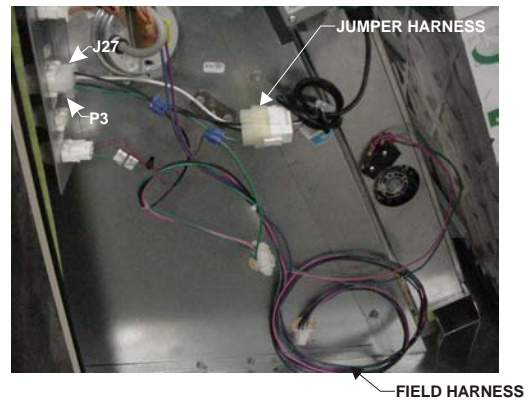


Figure 4

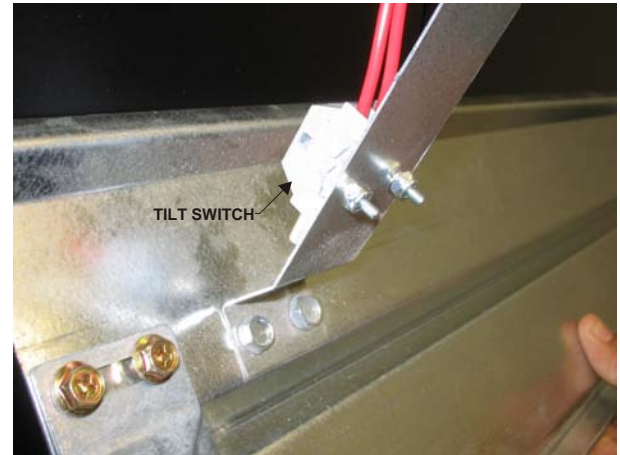


Figure 5

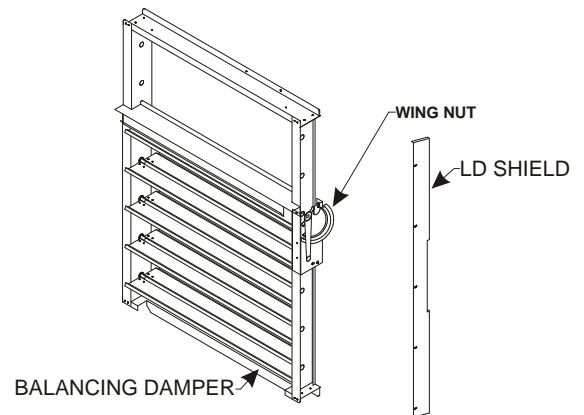


Figure 6



Figure 7

the top flange of the ERS under the upper most panel on the return air opening. Slide the ERS so that it is tight against the side and flush against filter access corner post of rooftop unit. Secure with the existing rooftop unit screws and the providing self-tapping screws. **See Figure 11.**

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

4. Remove the screws placed in the telescoping legs and adjust the legs on the ERS until it is level. Then replace all four screws in each leg to secure the ERS in the leveled position. **See Figure 10.**
5. Use provided 10-16 x 1/2" self-tapping screws to secure the side mounting flanges of the ERS to the rooftop unit.
6. 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.**
7. Remove the right front door panel labeled "control access" 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 12.**

If installing fixed wheel skip to step 12

8. Locate the A7 enthalpy control sensor (if removed earlier from the rooftop unit.) **See Figure 2.**
9. 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 13.**
10. 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 14 and Page 13** for field wiring diagram.
11. Remove ERS support block to allow wheel rotation when unit is placed in operation. **See Figure 15.**
12. 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.
13. 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 middle post to control box per the wiring diagram. **See Figure 16 and 17.**
14. 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.

15. Replace access panels onto the ERS unit and secure.



Figure 8



Figure 9



Figure 10

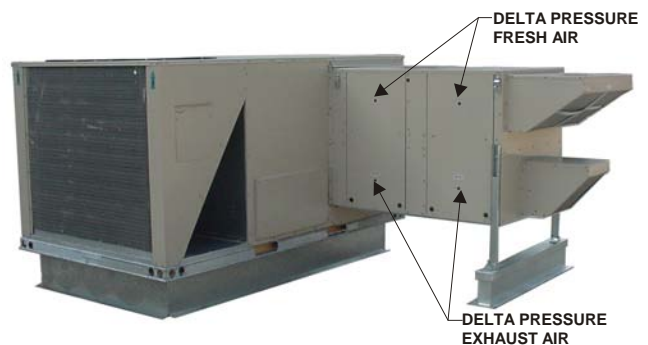


Figure 11

ROOFTOP UNIT WIRING (See Field Wiring Diagram)

1. Open access panel to rooftop unit controls.
2. Disconnect red wire marked J3-3 from TB34 terminal 1. **See Figure 18.** Add extension wire (provided) to J3-3 wire. Connect J3-3 to K3 blower relay coil terminal A. **See Figure 19.**
3. Affix D3 wiring diagram sticker, provided in kit, over current economizer sticker on compressor access door. Affix F3 wiring sticker, also provided, in alphanumeric order next to current diagrams.
4. 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. **See Figure 20** for economizer control board.

Wheel Pivot Adjustment

Set the economizer to the required minimum outdoor air setting and verify that the tilt switch (S168) is activated at this point. If not, bend the sheet metal bracket until switch is activated.

During default operation the energy recovery wheel will pivot out of the fresh air stream when outdoor air dampers reach 50% open. The wheel will pivot back into the fresh air stream when the outdoor air dampers return to 40% open or move to minimum position. Electronic configure to order (ECTO) parameters must be changed to pivot the wheel in and out of the fresh air stream at damper positions other than default. Use the A55 Integrated Modular Controller (IMC) located in the rooftop unit control area to adjust parameters. **See Figure 21 and 22** to adjust the parameters. Also see the Power Exhaust Operation section of the IMC manual provided with the rooftop unit. ECTO 8.16 must be set at zero; see ECTO 8.16 Exhaust Control table in the Lennox IMC manual.

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

- * ECTO 8.20 Setpoint (default=50%)
Damper position where the wheel starts to pivot out of the air stream.
- * ECTO 8.21 Deadband (default=10% of travel or 40%)
Damper position where the wheel starts to pivot back into the air stream.

Note: *Optional Software can also be used to make ECTO adjustments.*

5. Close access panels on the rooftop unit and secure.
6. Restore power to unit.
7. Once ERS is working properly, caulk any open joints, holes, or seams to make the units completely air and water tight.
8. Leave this instruction manual with owner or in an envelope to be kept near unit.

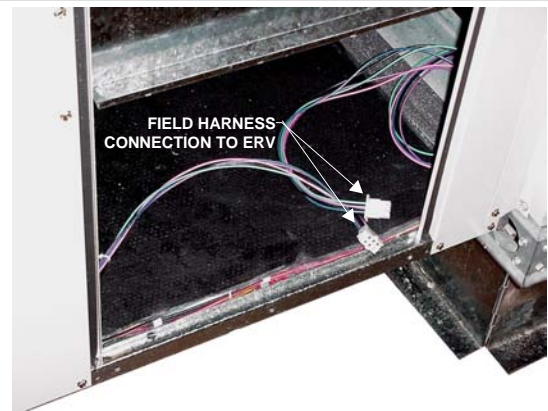


Figure 12



Figure 13

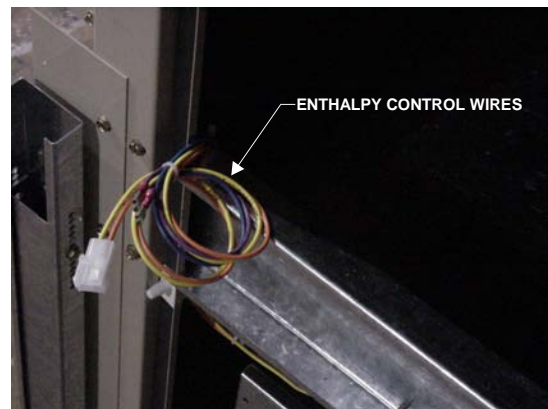


Figure 14



Figure 15

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

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 (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.

BLOWER SPEED ADJUSTMENT

Blower speed selection is accomplished by adjusting the motor sheave on both fresh air and exhaust air blowers. All blowers are factory set in closed position 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.**

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 (Pivoting Only)

On the activation of the economizer mode (closure of end switch), the ERS unit will shutdown for approximately 60 seconds to allow the ERS media to pivot out of the air

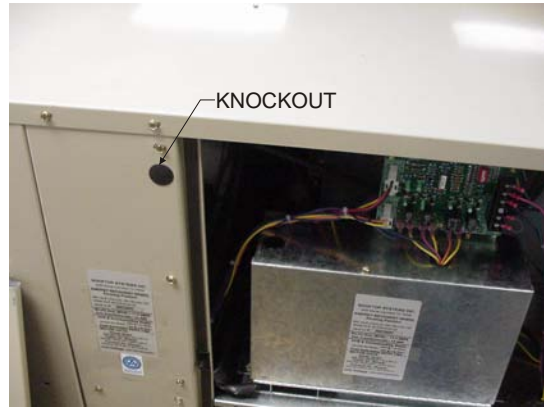


Figure 16

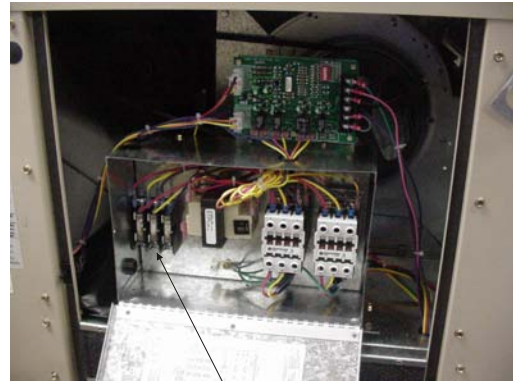


Figure 17

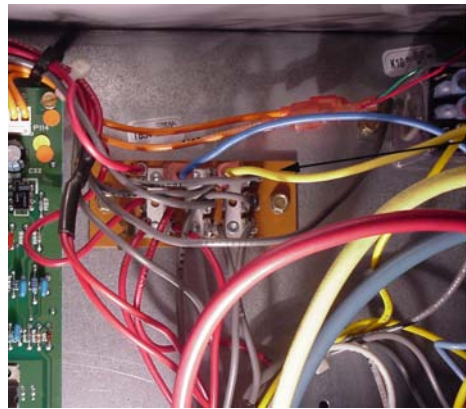


Figure 18

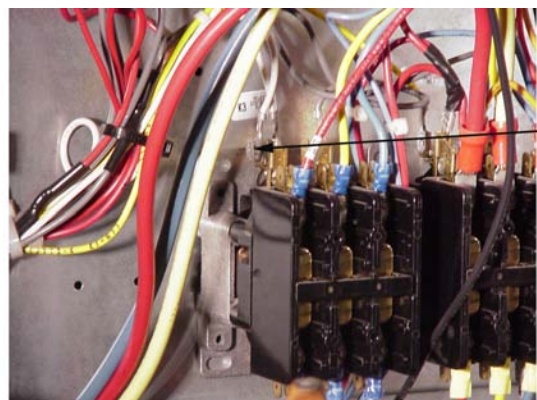


Figure 19

stream. After this delay timer has been satisfied, the exhaust air blower will operate. The ERS unit will act as a power exhaust unit.

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.

Then if economizer continues to close the ERS will shutdown and S168 will be deactivated, thus allowing rooftop unit to run in night set back mode.

SYSTEM CHECK

If installing fixed wheel skip to step 6

1. Disconnect ERS main power.
2. Remove ERS control access panel and install jumper at low voltage terminal strip between TB37-1 and TB37-2. Wheel should pivot out of air stream.

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.

3. 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.
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 from ERS control board TB37-1 and TB37-2. The recovery wheel will pivot into the air stream, the fresh air dampers will close, and after a delay, the fresh air blower and 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.

MAINTENANCE

Motor Maintenance

All motors use prelubricated sealed bearings; no further lubrication is necessary.



Figure 20

Change ECTO:

1. Turn ECTO switch on.
2. Pushbutton to desired parameter. Short push advances parameter. Long push advances block.
3. Read present ECTO value with SHIFT switch.
4. Single push increases the value by 1; double push decreases the value by 10.
5. Turn off SHIFT switch. (For multiple changes repeat steps 2 through 5.)
6. Wait for the parameter number to reappear. Turn off ECTO switch.

Figure 21

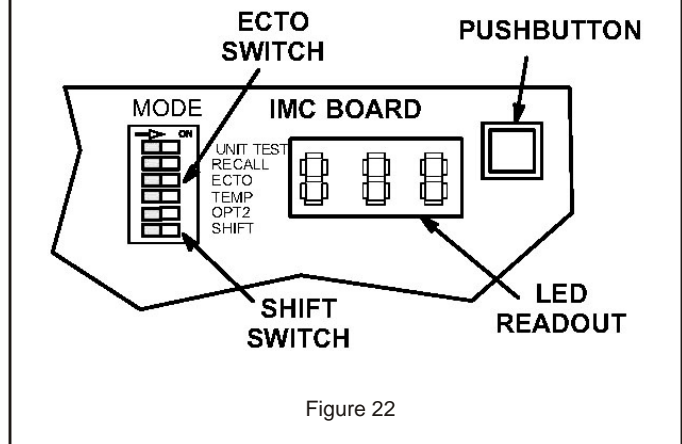


Figure 22

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

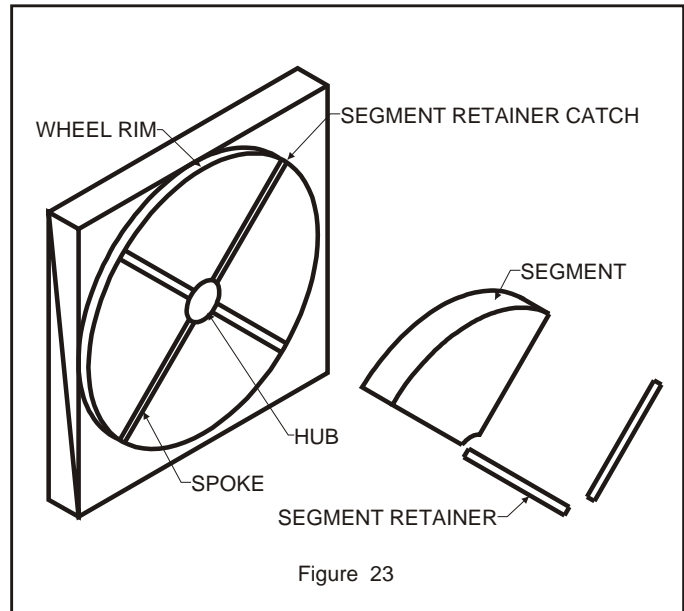
Always move the drive unit forward so the belt can be easily slipped into the groove without forcing them. Never force the belt into a sheave with a screw driver or wedge. You will damage the fabric and break the cords. It is recommended that the pulley center distances be offset by $\frac{3}{4}$ " for 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 $\frac{1}{64}$ " for every inch in span length.

Energy Wheel Maintenance

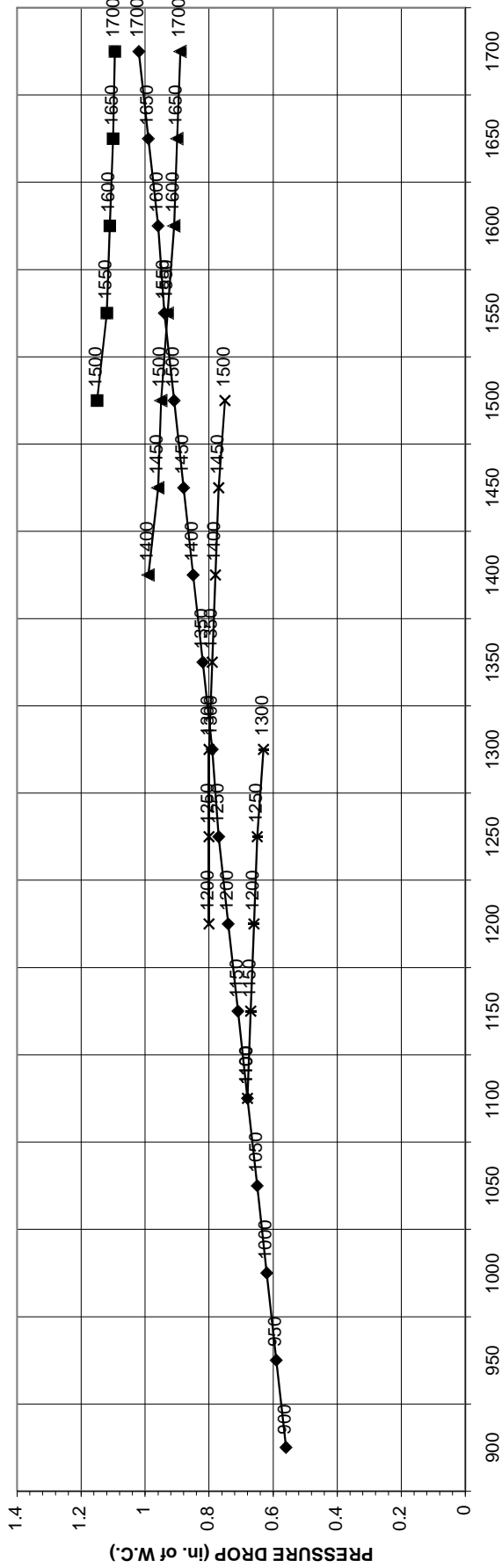
Four pie-shaped ERW segments are seated on stops between the stainless steel spring retainers, secured to the hub and rim of wheel. Annual inspection of the self cleaning wheel is recommended. With power disconnected, remove ERV access panels (rear) and unplug (J150 & P150). Refer to wiring diagram in 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 23.** Discoloration and staining of ERV 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.



50(R/P)2031xH Series

ENERGY RECOVERY VENTILATOR SCFM vs. PRESSURE DROP

◆—ERS ■—1200 RPM ▲—1100 RPM ✕—1000 RPM *—900 RPM



Equation of line: $SCFM = (PD - 0.0492647) / 0.0005721$

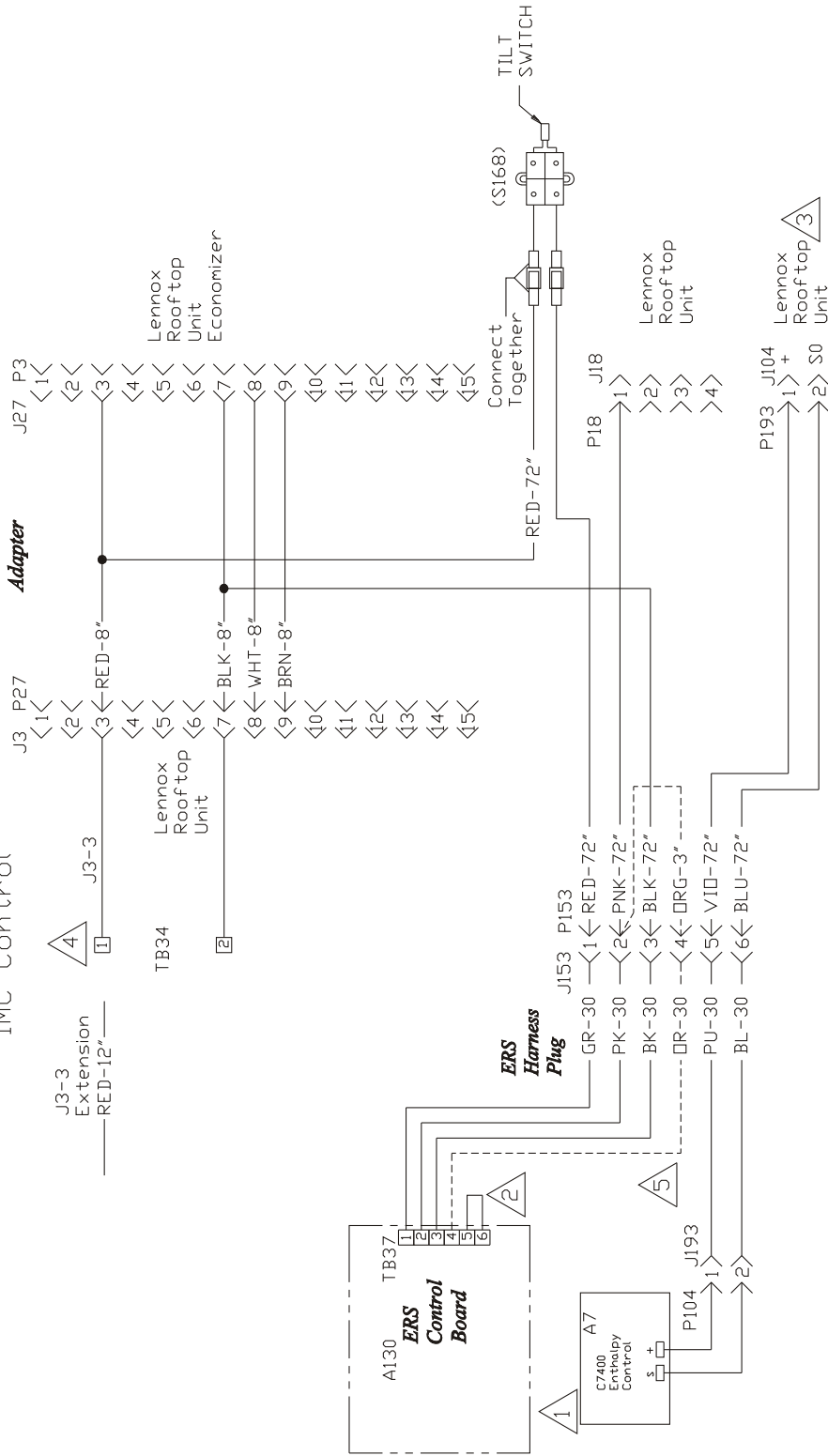
TABLE #1

Field Wiring Harness

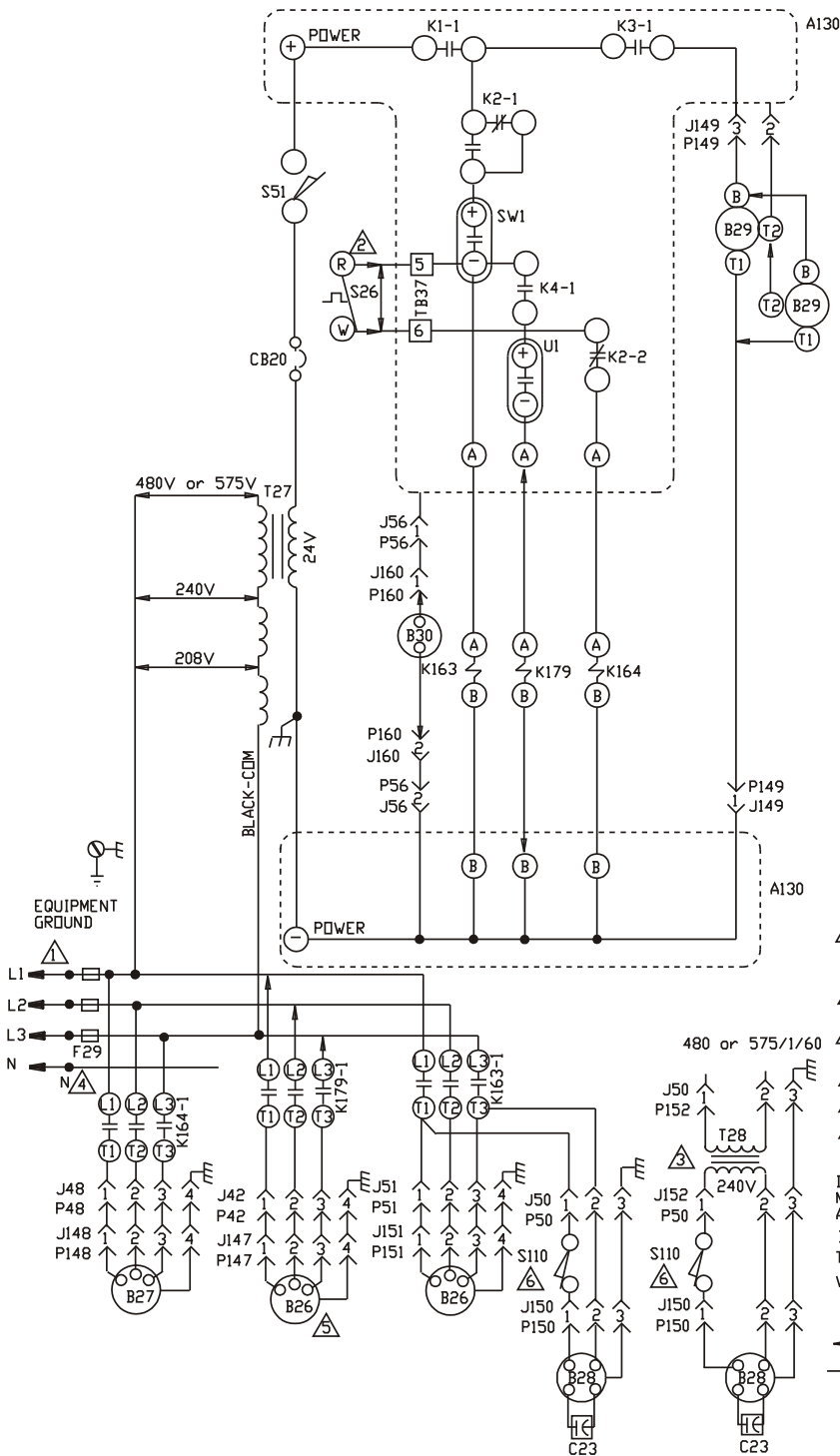
"L" SERIES
(PIVOTING)

with

IMC Control



- 1 Reposition enthalpy control (A7) into intake hood of ERV from rooftop unit economizer.
- 2 Remove jumper to install optional low ambient switch.
- 3 Not used for either global enthalpy or sensible temperature.
- 4 Reposition wire J3-3 in rooftop unit at TB34 to K13-2 terminal 9 (Direct Drive) or K3-A (Belt Drive) by adding extension.
- 5 This wire is used only on 5600 CFM units or higher.



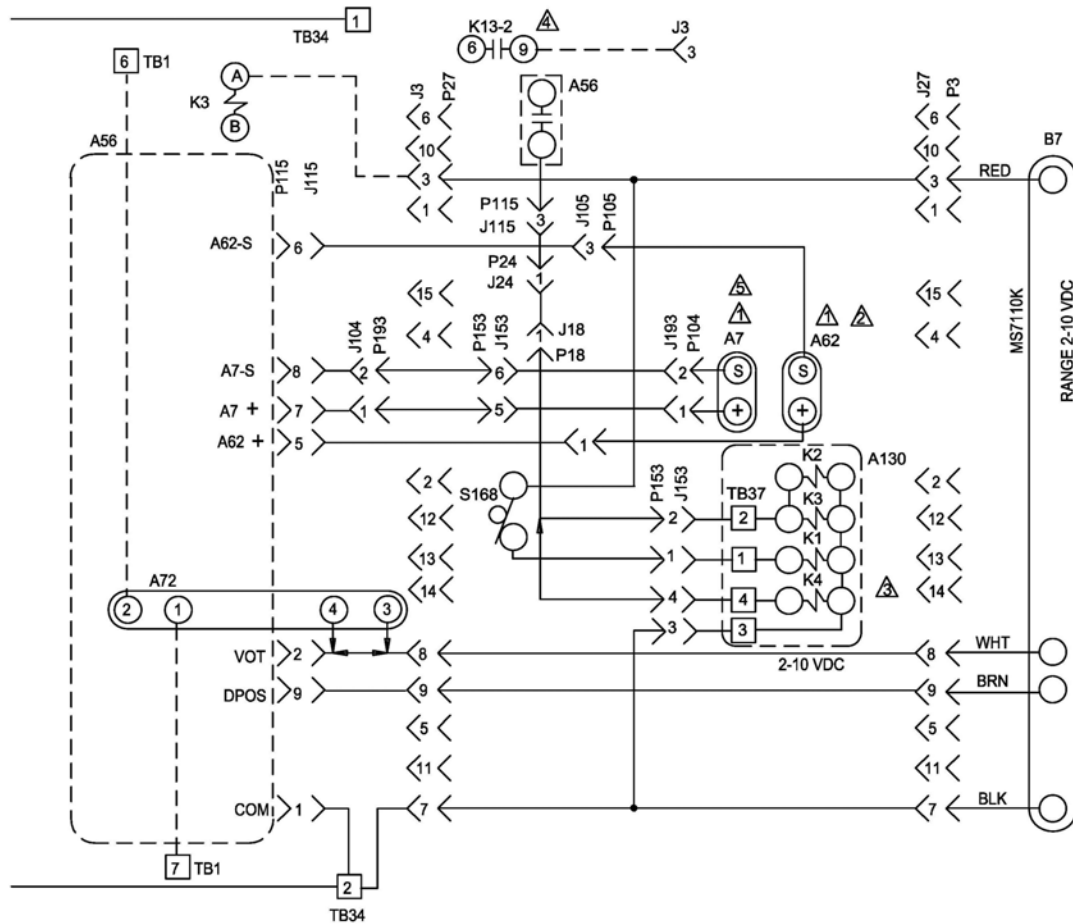
KEY	DESCRIPTION
A130	CONTROL-PIVOT WHEEL
B26	MOTOR-EXHAUST AIR BLOWER
B27	MOTOR-FRESH AIR BLOWER
B28	MOTOR-DESICCANT WHEEL
B29	MOTOR-WHEEL AND DAMPER
B30	MOTOR-DAMPER OPTIONAL
C23	CAPACITOR-WHEEL MOTOR
CB20	CIRCUIT BREAKER-DESICCANT WHEEL
F29	FUSE-DESICCANT WHEEL
J42	JACK-EXHAUST FAN
J48	JACK-MOTOR VARIABLE SPEED
J50	JACK-TRANSFORMER
J51	JACK-EXHAUST BLOWER
J56	JACK-DAMPER MOTOR BOARD
J147	JACK-EXHAUST AIR BLOWER
J148	JACK-FRESH AIR BLOWER
J149	JACK-WHEEL AND DAMPER MOTOR
J150	JACK-WHEEL MOTOR
J151	JACK-EXHAUST BLOWER MOTOR
J152	JACK-TRANS. EXHAUST BLOWER MOTOR
J160	JACK-DAMPER MOTOR
K163-1	CONTACTOR-EXHAUST AIR
K164-1	CONTACTOR-FRESH AIR BLOWER
K179-1	CONTACTOR-EXHAUST AIR
P42	PLUG-EXHAUST FAN
P48	PLUG-MOTOR, VARIABLE SPEED
P50	PLUG-TRANSFORMER
P51	PLUG-EXHAUST BLOWER
P56	PLUG-DAMPER MOTOR BOARD
P147	PLUG-EXHAUST AIR BLOWER
P148	PLUG-FRESH AIR BLOWER
P149	PLUG-WHEEL AND DAMPER MOTOR
P150	PLUG-WHEEL MOTOR
P151	PLUG-EXHAUST BLOWER MOTOR
P152	PLUG-TRANS. EXHAUST BLOWER MOTOR
P160	PLUG-DAMPER MOTOR
S26	THERMOSTAT-AMBIENT
S51	SWITCH-DOOR INTERLOCK 1
S110	SWITCH-TIP
T27	TRANSFORMER-DESICCANT WHEEL
T28	TRANSFORMER-STEPDOWN, WHEEL MOTOR

- ⚠ NOTE-FOR USE WITH COPPER CONDUCTORS 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 (380/3/50) VOLTAGE HOOKUP
- ⚠ USED ON HIGHER CFM UNITS
- ⚠ S110 CLOSED DURING RECOVERY MODE S110 IS OPEN DURING ECONOMIZER MODE

IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING AND INSULATION THICKNESS
 DISCONNECT ALL POWER BEFORE SERVICING
 THERMOSTAT HEAT ANTICIPATION SETTING 0.1 AMP
 WARNING-ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES

← DENOTES OPTIONAL COMPONENTS
 — LINE VOLTAGE FIELD INSTALLED NEC/CEC CLASS 1
 NOTE-ALL REMAINING WIRES FACTORY INSTALLED

WIRING DIAGRAM		8/02
COMBINATION PACKAGED/ROOFTOP		
PIVOTING ENERGY RECOVERY WHEEL "L" SERIES AND 16 SERIES G, J, M, Y VOLTAGE UNITS		
HEAT/COOL SECTION F3		
Supersedes Form No.		New Form No. 534,213W



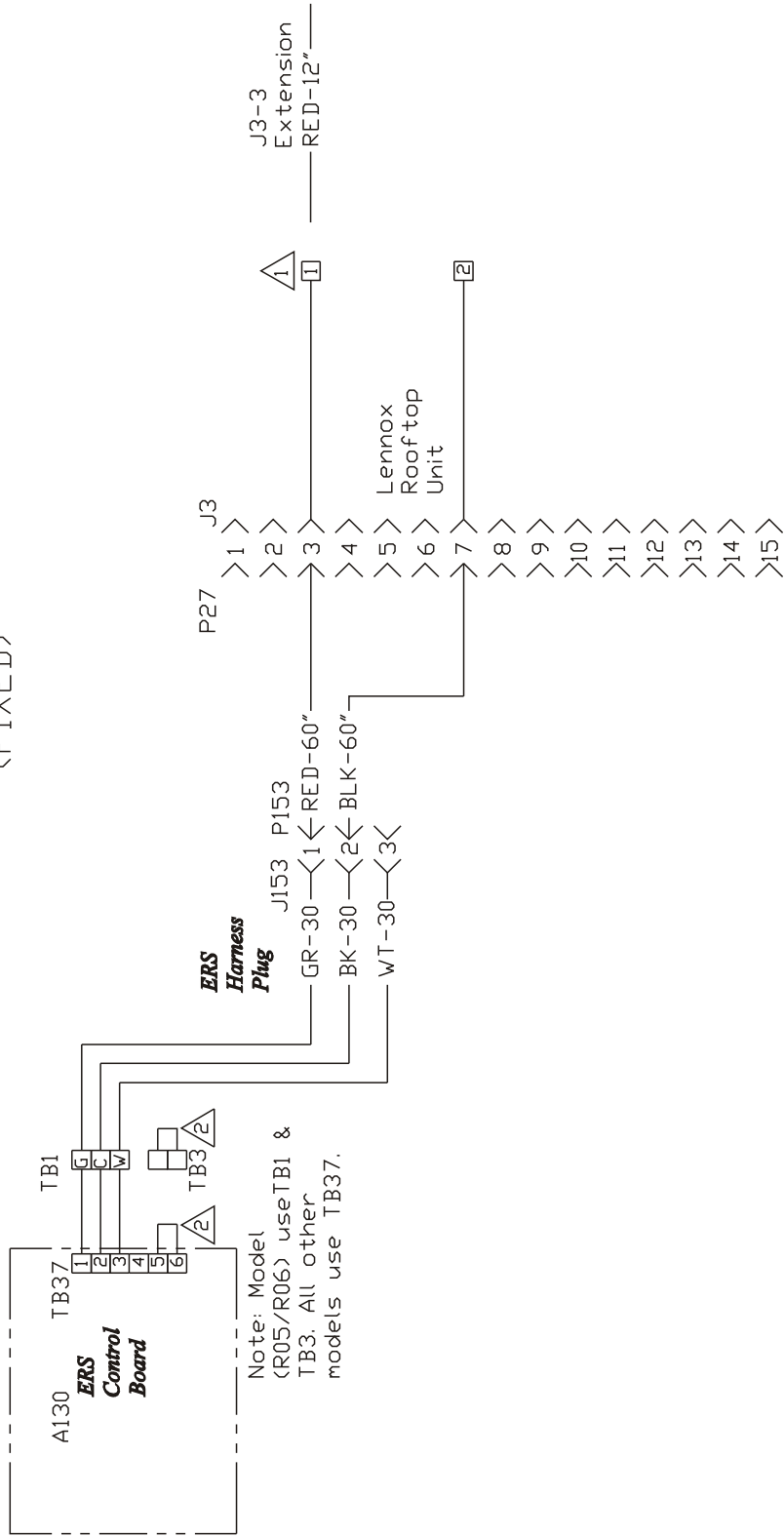
KEY	DESCRIPTION
	COMPONENT
A7	SENSOR-SOLID STATE ENTHALPY
A56	PANEL-ECONOMIZER
A62	SENSOR-ENTHALPY, INDOOR
A72	CONTROL-REMOTE, MIN POS (OPT)
A130	CONTROL-ERS
B7	MOTOR-DAMPER
J3	JACK-UNIT ECONOMIZER
J18	JACK-EXHAUST FAN
J24	JACK-EXHAUST FAN
J27	JACK-ECONOMIZER ADAPTER
J104	JACK-SENSOR, OUTDOOR ENTHALPY
J105	JACK-SENSOR, RETURN AIR ENTHALPY
J115	JACK-ECONOMIZER, OUTPUT
J153	JACK-ENTHALPY/DAMPER MOTOR
J193	JACK-ENTHALPY SENSOR
K3	CONTACTOR-BLOWER
K13-2	RELAY-COMBUSTION AIR INDUCER
P3	PLUG-UNIT ECONOMIZER
P18	PLUG-EXHAUST FAN
P24	PLUG-EXHAUST FAN
P27	PLUG-ECONOMIZER ADAPTER
P104	PLUG-SENSOR, OUTDOOR ENTHALPY
P105	PLUG-SENSOR, RETURN AIR ENTHALPY
P115	PLUG-ECONOMIZER, OUTPUT
P153	PLUG-ENTHALPY/DAMPER MOTOR
P193	PLUG-ENTHALPY SENSOR
S168	SWITCH-DAMPER CLOSED
TB1	TERMINAL STRIP-CLASS II VOLTAGE
TB34	TERMINAL STRIP-TRANSFORMER T1

- ⚠ 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.
- ⚠ K4 IS USED ON HIGHER CFM UNITS.
- ⚠ FOR L SERIES UNITS, 036,042,048,060,072 WITH B3 DIRECT DRIVE BLOWER MOTOR WITH HEATING AND COOLING SPEEDS, CONNECT WIRE FROM J3-3 TO K13-9.
- ⚠ REPOSITION A7 ENTHALPY SENSOR FROM ROOFTOP UNIT ECONOMIZER INTO INTAKE HOOD OF ERV ROOFTOP UNIT

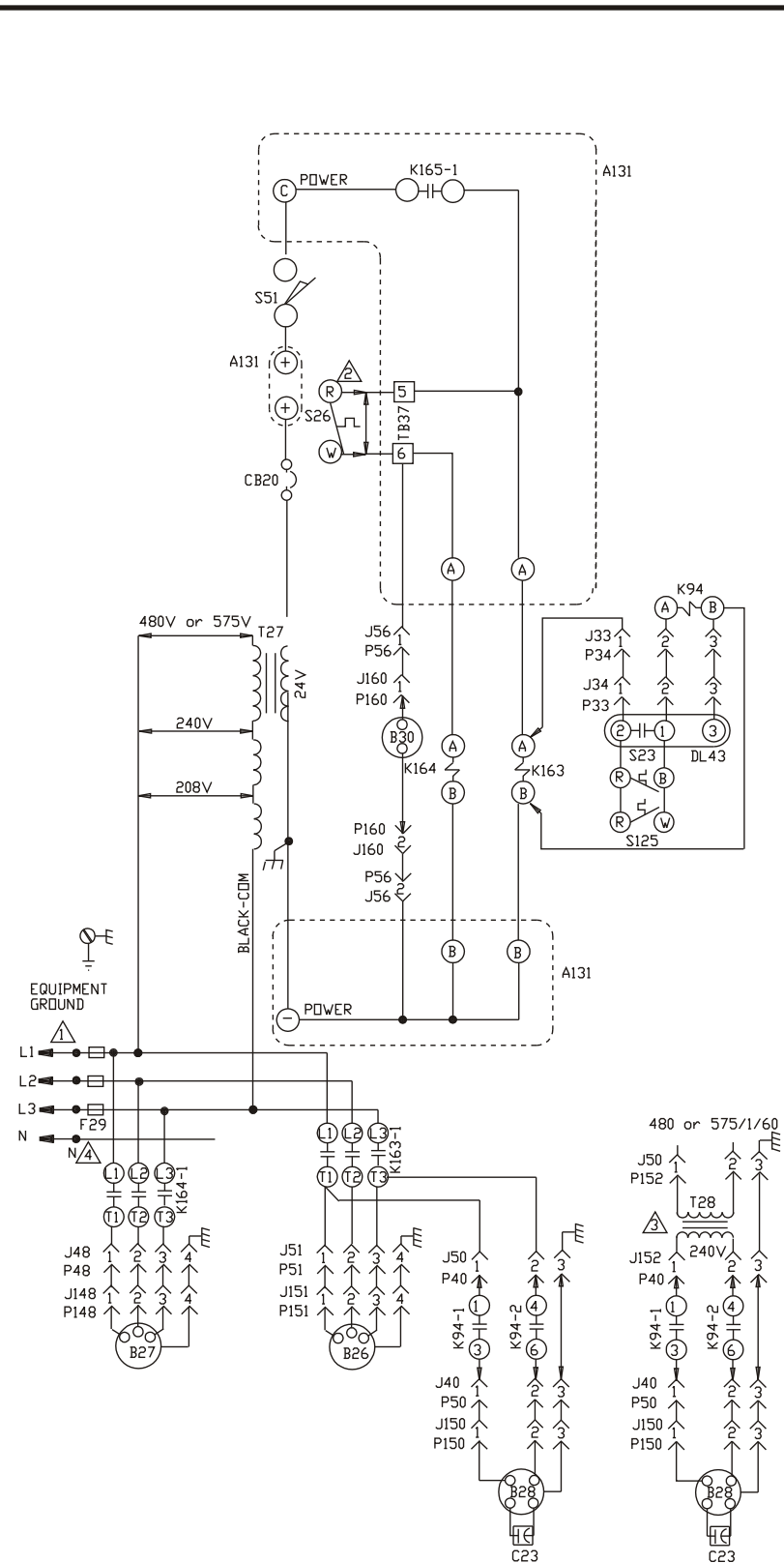
	WIRING DIAGRAM	6/08
	ACCESSORIES	
OAD WITH PIVOTING WHEEL ENERGY RECOVERY SYSTEM		
ECONOMIZER-SECTION D1		
Supersedes Form No. 535,056W		New Form No. 537099-01

Field Wiring Harness

"L" SERIES (FIXED)



- ① Reposition wire J3-3 in rooftop unit at TB34 to K13 terminal 9 (Direct Drive) or K3-A (Belt Drive) by adding extension.
- ② Remove jumper to install optional low ambient switch.



KEY	DESCRIPTION
	COMPONENT
A131	CONTROL-FIXED WHEEL
B26	MOTOR-EXHAUST AIR BLOWER
B27	MOTOR-FRESH AIR BLOWER
B28	MOTOR-DESICCANT WHEEL
B30	MOTOR-DAMPER OPTIONAL
C23	CAPACITOR-WHEEL MOTOR
CB20	CIRCUIT BREAKER-DESICCANT WHEEL
DL43	DELAY-CYCLE TIMER
F29	FUSE-DESICCANT 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, BOARD
J148	JACK-FRESH AIR BLOWER
J150	JACK-WHEEL MOTOR
J151	JACK-EXHAUST BLOWER MOTOR
J152	JACK-TRANS, EXHAUST BLOWER MOTOR
J160	JACK-DAMPER MOTOR
K94-1,2	RELAY-ON-OFF
K163,-1	CONTACTOR-EXHAUST AIR
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, BOARD
P148	PLUG-FRESH AIR BLOWER
P150	PLUG-WHEEL MOTOR
P151	PLUG-EXHAUST BLOWER MOTOR
P152	PLUG-TRANS, EXHAUST BLOWER MOTOR
P160	PLUG-DAMPER MOTOR
S23	SWITCH-LOW AMBIENT CUT IN
S26	THERMOSTAT-AMBIENT
S51	SWITCH-DOOR INTERLOCK 1
S125	SWITCH-AMBIENT OVERRIDE
T27	TRANSFORMER-DESICCANT WHEEL
T28	TRANSFORMER-STEPDOWN, WHEEL MOTOR

- ⚠ NOTE-FOR USE WITH COPPER CONDUCTORS 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 (380/3/50) VOLTAGE HOOKUP

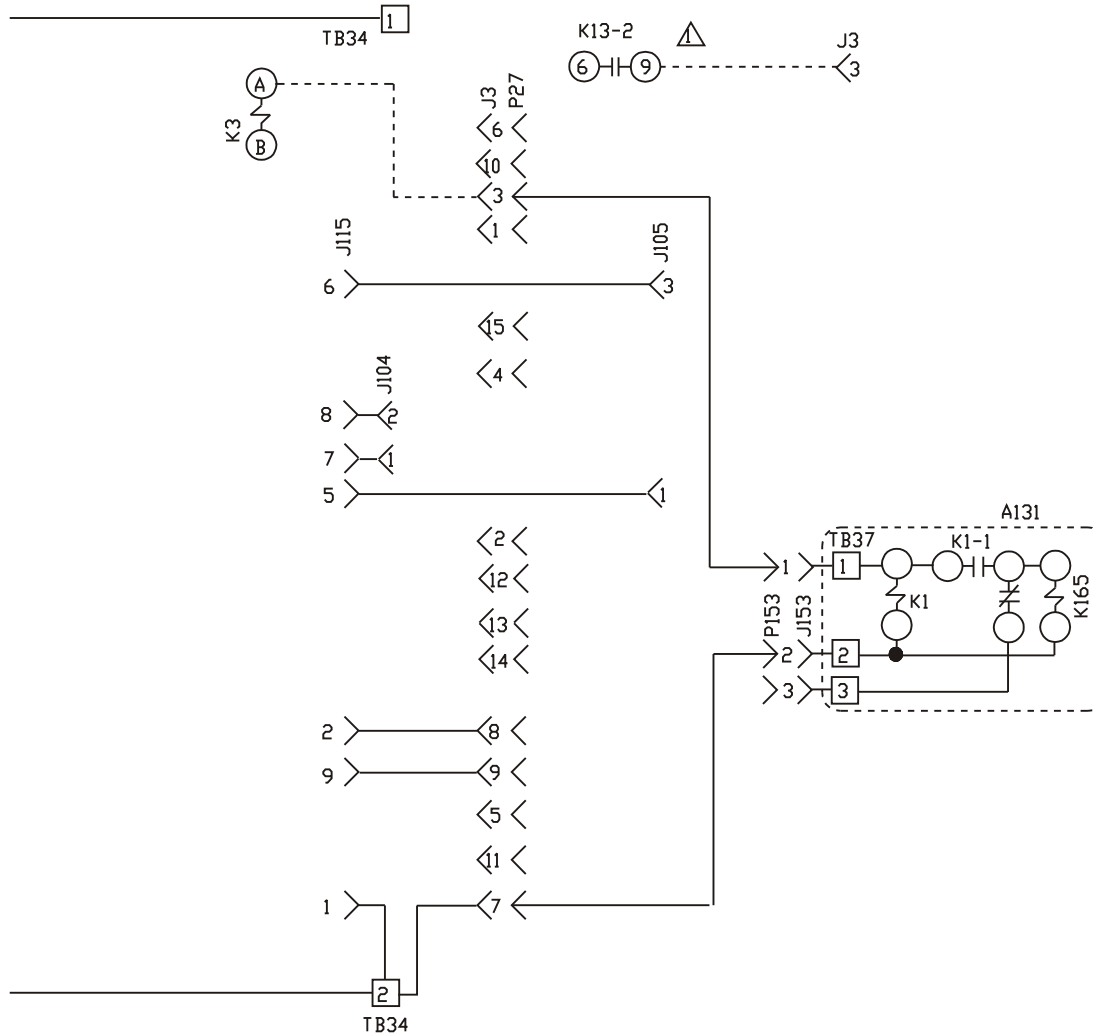
IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING AND INSULATION THICKNESS
 DISCONNECT ALL POWER BEFORE SERVICING
 THERMOSTAT HEAT ANTICIPATION SETTING 0.1 AMP
 WARNING-ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES

- ← DENOTES OPTIONAL COMPONENTS
- LINE VOLTAGE FIELD INSTALLED NEC/CEC CLASS 1
- NOTE-ALL REMAINING WIRES FACTORY INSTALLED

WIRING DIAGRAM		9/03
COMBINATION PACKAGED/ROOFTOP		
FIXED ENERGY RECOVERY WHEEL "L" SERIES AND 16 SERIES G, J, M, Y VOLTAGE UNITS		
HEAT/COOL SECTION F3		
Supersedes Form No.	New Form No. 534,227W	

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DESCRIPTION	
KEY	COMPONENT
A131	CONTROL-ERS
J3	JACK-UNIT ECONOMIZER
J104	JACK-SENSOR OUTDOOR ENTHALPY
J105	JACK-SENSOR RETURN AIR ENTHALPY
J115	JACK-ECONOMIZER OUTPUT
J153	JACK-ENTHALPY/DAMPER MOTOR
K3	CONTACTOR-BLOWER
K13-2	RELAY-COMB AIR INDUCER
P27	PLUG-ECONOMIZER ADAPTER
P153	PLUG-ENTHALPY/DAMPER MOTOR
TB34	TERMINAL STRIP-TRANSFORMER T1

△ FOR L SERIES UNITS, 036,042,048,060,072 WITH B3 DIRECT DRIVE BLOWER MOTOR WITH HEATING AND COOLING SPEEDS, CONNECT WIRE FROM J3-3 TO K13-9.

WIRING DIAGRAM		9/02
ACCESSORIES		
EQUIPPED WITH FIXED WHEEL ENERGY RECOVERY SYSTEM FOR "L" SERIES UNITS		
SECTION-D3		
Supersedes Form No.	New Form No.	
	534,229W	

Lennox Model No.	Req'd Curb Height	CFM Range	Voltage	Phase
50-P20-31xH-23	14"	1100-1700	208-230	3
50-P20-31xH-33	14"	1100-1700	460	3
50-P20-31xH-43	14"	1100-1700	575	3
50-R20-31xH-23	14"	1100-1700	208-230	3
50-R20-31xH-33	14"	1100-1700	460	3
50-R20-31xH-43	14"	1100-1700	575	3

START UP INFORMATION SHEET

VOLTAGE - UERV 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 - UERV 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.