STAND ALONE ERV OVER / UNDER SERIES

INSTALLATION INSTRUCTIONS

OU01-GERV
January 11, 2023
Supersedes: 01-24-20

VO, VN, O, N, -20,-28,-36,-46,-62

INSTALLATION INSTRUCTIONS FOR ENERGY RECOVERY VENTILATOR (FIXED) FOR STAND ALONE OVER / UNDER ROOFTOP AND INDOOR APPLICATIONS

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

I - Shipping And Packing List

Package contains:

1 — Energy Recovery Ventilator Assembly

II - Shipping Damage

Thoroughly check unit for shipping damage. Receiving party is responsible for contacting the last carrier immediately if shipping damage is found.

III - 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.

IV - Requirements

When installed, the unit must be electrically wired and grounded in accordance with local codes or, in absence of local codes, with the current National Electric Code, and National Fire Protection Agency ANSI/NFPA No. 70.

⚠ WARNING

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.

⚠ CAUTION

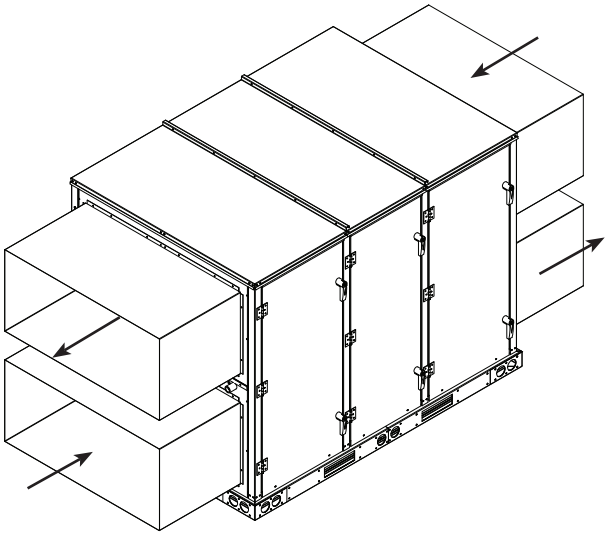
Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.

V - Application

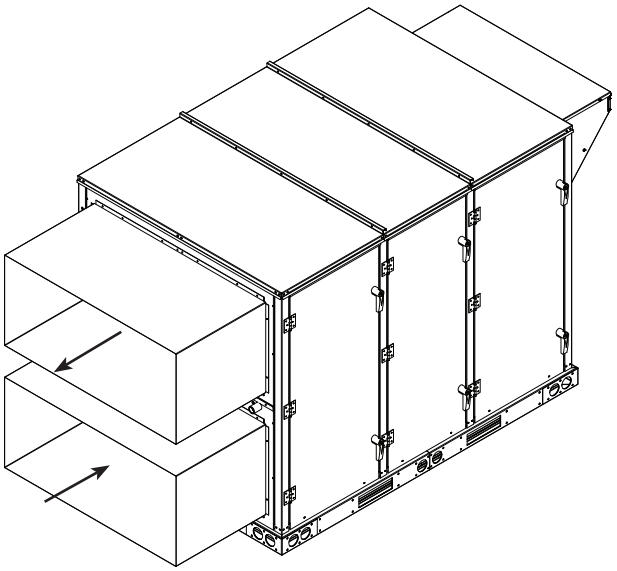
These over/under Energy Recovery Ventilators (ERVO) can be ordered and used in many combinations of side or down discharge and return. Indoor or outdoor configurations with a field provided balancing damper assembly can either be set on a roof, penetrating down through a curb on a roof, in a mechanical room, or hung above a drop ceiling. The units can be ordered in 3 basic airflow options, but are designed to be easily modified in the field to meet other ductwork configurations as well as accessory and controls options.

These ventilators conserve energy by transferring humidity and heat energy across two opposing air streams using a rotary heat exchanger (the energy recovery wheel). This process works in the summer by rejecting heat energy from incoming intake air and in the winter by conserving heat energy from the exhaust air, allowing outdoor ventilation rates to be increased by factors of three or more without additional energy penalty or increase in size of heating or air conditioning systems.

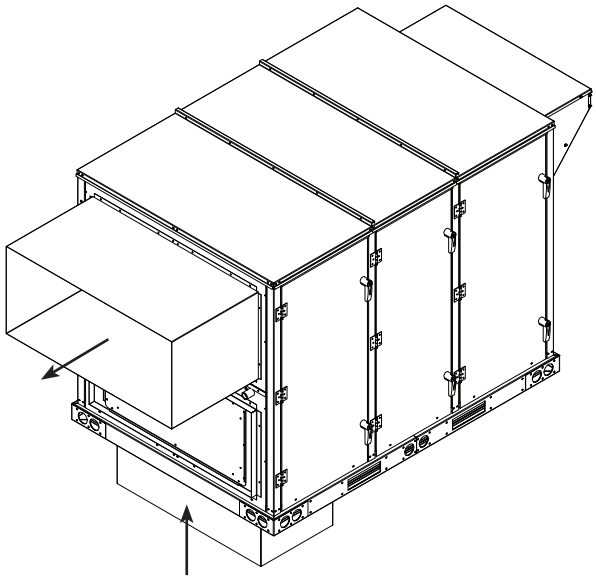
Indoor Over / Under - N



Rooftop Over / Under - O



Rooftop Bottom Return / Top Supply - Field Option



VI - Rigging Unit For Lifting

1. Maximum weight of unit is — Varies per Series {300-1200 Lbs.} (Crated)
2. Remove crating.
3. All doors must be closed and secured for rigging.
4. Remove box containing screws and accessories from the Controls section.
5. Attach lifting straps to the provided lifting cut outs located on the base rail at the four corners of the units. On units 46 and above, an extra set of lifting points are provided in the middle of the units. **See Figure 1.**
6. Position unit on roof curb being sure to provide service access to ERV control access door and wheel.

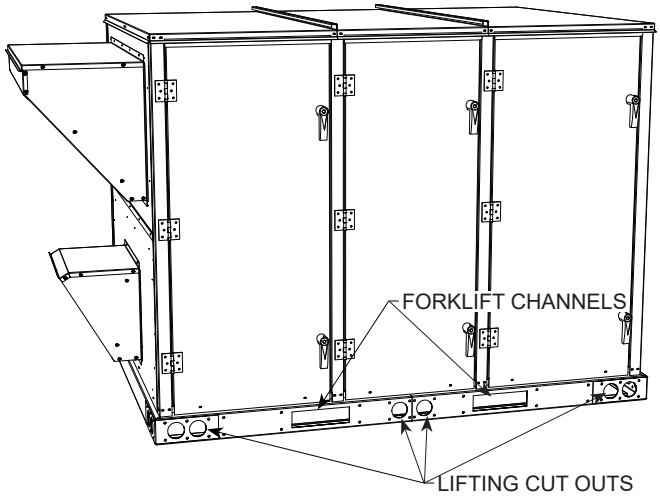


Figure 1

VII - Service Clearances

Do not position the unit with the outdoor air intake into the prevailing wind and keep the intake away from any other exhaust fans. Likewise, position the exhaust discharge opening away from the outdoor intakes of other units.

The following items must be completed prior to rigging and lifting the ERV onto the roof.

1. Roof Mounting Frame (RMF) must be squared and positioned to provide minimum clearances shown in **Figure 2**. (**See Page 18 for dimensions)**
2. In a down return or exhaust configuration, duct work should be installed into roof curb before installing the ERV on the curb.
3. RMF must be installed, flashed and sealed in accordance with the manufacturer's instructions provided with the frame.
4. Roof curb gasket must be applied to all top surfaces of the curb. (Refer to roof curb installation instruction.)

When hanging the unit from the structure for indoor installations, proper rigging should be used. Run Unistrut or angle iron lengthwise to prevent interference with the hinged access doors. Minimum ⅜" all-thread is required.

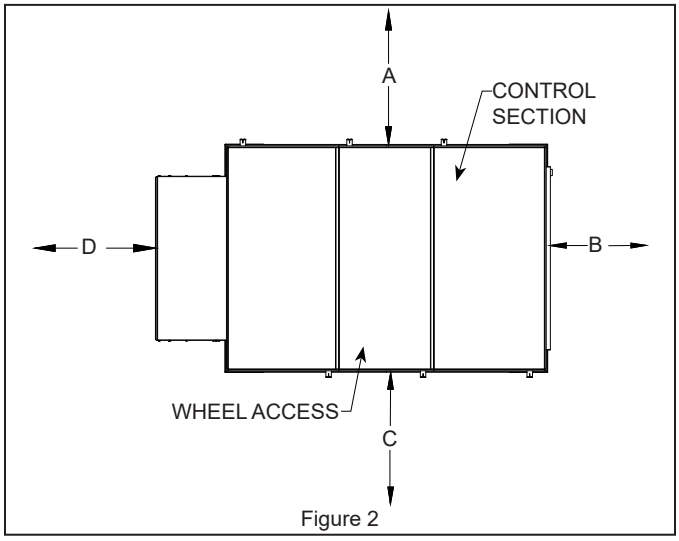


Figure 2

MINIMUM CLEARANCES (INCHES)				
UNIT	A	B	C	D
ERVO 20	36	30	36	36
ERVO 28				
ERVO 36				
ERVO 46				
ERVO 62	48	36	48	48

VIII - Installation

Low Voltage

1. Route class II low voltage wire (3 conductor) from thermostat, relay, or Energy Management through a field installed conduit to a Drill Here location on the side panel of ERV (next to high voltage connector), or in the return duct to the (**Page 4**) controls section of the ERV. See Control Schemes for wiring information. **See Figure 4.**

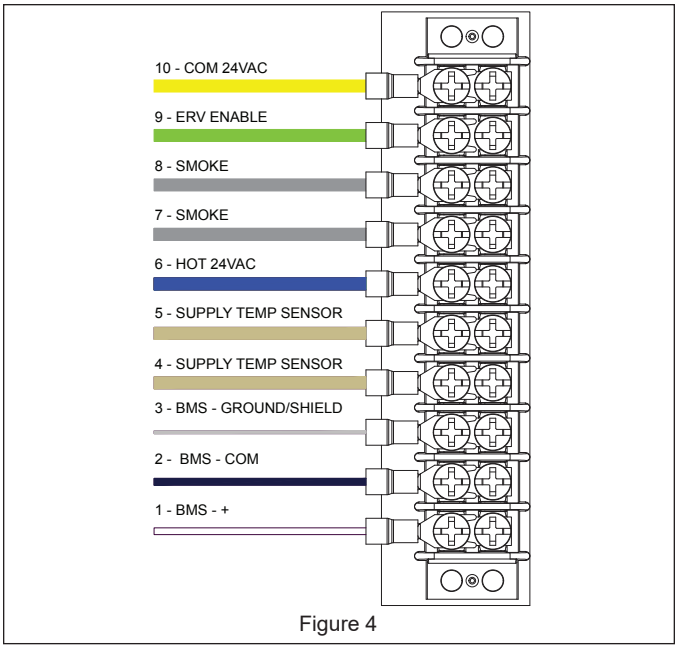


Figure 4

High Voltage

2. All electrical connections must conform to any local codes and current National Electric Codes (NEC) and Canadian Electric Codes (CEC). Refer closely to unit wiring diagram in unit and/or in these instructions for proper wiring connections.
3. Refer to the unit nameplate for minimum circuit ampacity (MCA) and maximum overcurrent protection size (fuse).
4. Electrical data is listed on unit rating plate and motor name plates.
5. Connect line voltage power from field installed power disconnect to the provided junction box above the controls section of the unit. A ¾" connector is provided for units up to 36, 46 and above have a 1" fitting. **See Figure 5.**


Figure 5

6. Ground unit with a suitable ground connection either through unit supply wiring or an earth ground.

Note: Unit voltage entries must be sealed weather tight after wiring is complete.

7. Open motor access doors and check that both blowers have belts in place and that motors spin freely. Blower RPM can be adjusted to meet CFM and external static pressure requirements by adjusting the sheave on the blower motors, by replacing the pulley kits, or by programming the optional variable frequency drives (**See Optional Kits**). Multiple pulley arrangements are available from the manufacturer to meet the entire range of the units CFM options.

Note: Units with optional VFDs are factory equipped with high speed pulley kits. All other units are shipped with a pulley kit configured during ordering to meet CFM requirements.

Caution: Blower speed must be adjusted for the given external static pressure and airflow (CFM) requirements. If blower speed is not adjusted for conditions, possible motor over loading can occur.

8. **Unit Startup:** Turn on power disconnect, turn on unit either from controls or by jumping 24v+ from terminal #6 to terminal #9. **See Figure 4.** Check that motors are spinning the correct direction that the enthalpy wheel is spinning and that motorized intake air and exhaust dampers are opening.
9. Close access doors on the ERV unit and check all ¼ turn handles to make sure they are secure.
10. Restore power to unit.
11. Cleanup: once unit is operating properly, caulk any open joints, holes or seams to make the units completely air and water tight. Remove any jumpers and make sure all access doors to the unit are closed and secured.
12. Leave this instruction manual with owner or in an envelope to be kept near unit.

IX - Stand Alone ERV Controls Schemes

Dependent options

Thermostat: This is the standard way to wire an ERV. When the ductwork of the standalone ERV is attached to the ductwork of a single AC system, the controls of the ERV should be wired in parallel with the controls with "G" to 9, "C" to 10. The ERV will operate whenever the RTU's blower is operating. If the system the ERV is being attached to has a separate blower speed for Heat, a relay will have to be set up to switch between W and G outputs from the RTU/AHU to terminal #9 on the ERV.

Energy Management: Building Management Systems: Communication wire is attached to the terminal strip in the following manner + terminal 1, - terminal 2, shield terminal 3. A baud rate of 38,400 should be chosen if BMS does not discover the controls automatically. All units have an individual instance ID that is factory set during production and a mac ID that is field adjustable via dip switches on the FEC controller. IOM Mac ID is 5.

Note: If duplicate instance IDs may be an issue on a jobsite, a specific instance ID may be requested during ordering/ manufacture. See Sequence of Operations.

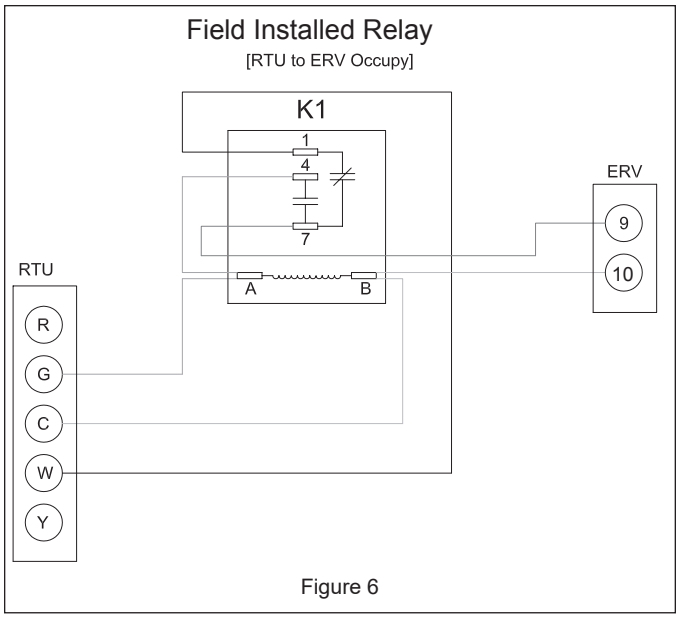


Figure 6

Dedicated options

The ERV is capable of using an external 24v signal for operation or using an internal 24v power source for short controls wire runs (less than 75 feet). If a dedicated controls option is needed and the thermostat wire run is more than 75 feet, an additional transformer will need to be added.

Thermostat: When using an ERV to service a large area with multiple AC units or when not tying directly into the ductwork of a single AC system, the ERV can be run off of its own Thermostat. Attach the 24V+ wire "R" to terminal #6 on TS2 , then wire "G" and "C" onto terminals #9 and #10 respectively. Program Thermostat to energize G when space is occupied. **See Figure 4.**

CO_2 Sensor/ Transmitter: An ERV can be wired to a wall mounted CO_2 Sensor/ Transmitter with relay like Johnson Controls CD-WR0-00-0 (or CD-WRD-00-0) in order to operate the ERV when ventilation is required due to high CO_2 levels. This type of transmitter has an adjustable set point, and a relay that the 24V+ signal can be wired, into and Normally Open contact can be wired out of. "Common" and "A" should be wired to terminal #6, "B" to terminal# 10, and "N/O" should be wired to terminal #9. The ERV will then turn on and provide fresh air to the space to lower CO_2 levels. **See Figure 4.**

Quickstep: Units equipped with the Quick Step controls option use a factory installed CO_2 sensor and variable frequency drives to modulate airflow through the ERV to control for Carbon Dioxide. To operate the unit, enter the Supply and Exhaust CFM values (they do not have to be the same value) via bluetooth, through the Bacnet interface, or Metasys display panel along with maximum CO_2 level and the controls will modulate the blowers to ensure CO_2 levels are not above set point. **See Sequence Of Operations.**

ON/OFF switch or Timer: Wire terminal #6 on TS2 to the "Com" terminal of the switch or timer relay, wire terminal #9 to the "N/O" sode of the switch or relay. The ERV can be turned on manually or be set to turn on at a regular schedule when the building is occupied.

X - Operation
How It Works

The unit contains an energy recovery wheel (ERW) that is a revolutionary concept in rotary air-to-air heat exchangers. Designed as a packaged unit for ease of installation and maintenance, only the connection of electrical power is required to make the system operational.

When slowly rotating through counter flowing exhaust and fresh air streams, the ERW absorbs sensible heat and latent heat from the warmer air stream in the first half of its rotation and transfers this total energy to the cooler air stream during the second half of this rotating cycle.

Rotating at 50-60 RPM, the ERW provides a constant flow of energy from the warmer to the cooler air stream. The large energy transfer surface and laminar flow through the ERW causes this constant flow of recovered energy to represent up to 85% of the difference in total energy contained within the two air streams.

Sensible and latent heat are the two components of total heat, sensible heat is energy contained in dry air and latent heat is the energy contained within the moisture of the air.

The latent heat load from the outdoor fresh air on an air conditioning system can often be two to three times that of the sensible heat load and in the winter it is a significant part of a humidification heat load. During both the summer and the winter, the ERW transfers moisture entirely in the vapor phase. This eliminates wet surfaces that retain dust and promote fungal growth as well as the need for a condensate pan and drain to carry water.

Because it is constantly rotating when in the air stream, the ERW is always being cleaned by air, first in one direction and then the other. Because it is always dry, dust or other particles impinging on the surface during one half of the cycle are readily removed during the next half of the cycle.

During the heating season, when outdoor air temperatures are below 15°F, it is recommended to use the (optional) low ambient kit.

XI - Optional Kits
Factory Installed

Low Ambient

Low Ambient protection uses the EA temp Sensor reading to determine if the wheel has frosted up. Under normal operating conditions, the only way the temperature can drop to 16°F is if there is no exhaust airflow through the wheel.

The Low Ambient protection closes the OA damper and turns off the Supply blower. The wheel is then rotated through the exhaust air until the frost has thawed, and a 20 degree rise at the EA temp sensor is registered.

Once the 20° temp rise is registered, the ERV resumes normal operation. The EA temp sensor is standard in all units and the default setting is to have the low ambient control on.

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

Start stop Jog

Start stop Jog uses the OA temp sensor reading to determine if conditions are appropriate for free cool or not. If the temperature range is within the factory set, but field adjustable, 40-70 degree range the wheel will stop rotating for 10 minutes to stop energy transfer, then rotate for a minute to clear any dust buildup.

All of the components needed for start stop jog are standard, but if the feature isn't ordered, the start stop jog enable point is set to false. SSJ can be set to true with a Metasys Display panel commissioning tool, or through any Bacnet compatible BMS system.

Rotation Alarm Sensor

A magnetic sensor and logic board that measure pulses from a magnet on the spinning energy recovery wheel. A lack of measured pulses after initial start up results in an alarm. The alarm can be wired into building management hardware or to a thermostat with alarm switch terminals. It will warn that the wheel has stopped spinning, but does not otherwise effect operation.

Filter Racks

Filters are available from the factory in 2" Merv 8, 11, or 13. Quantity is per rack. ERVO have return filter standard and outside filter racks are optional.

UNIT NUMBER	FILTER SIZE			
	PLEATED	QTY	MIST ELIMINATOR	QTY
ERVO-20	16x20x2	2	15.75x14.25x1	2
ERVO-28	18x20x2	2	14.5x17x1	2
ERVO-36	24x24x2; 20x24x2	1, 1	20x16x1	2
ERVO-46	24x24x2	2	20x16x1	2
ERVO-62	20x25x2; 16x25x2	2, 1	23.75x18.75x1	2

MOH

Motorized outdoor Damper: Mounts inside the cabinet and opens on a signal from FEC OUT 4 when the supply blower is enabled.

MEH

Motorized Exhaust Damper: Mounts inside the exhaust hood and opens on a signal from FEC OUT 5 when the exhaust blower is enabled.

Pressure sensor/gauge

Measurement devices (Magnahelics) on ERV that measure pressure across the energy recovery wheel.

CO_2 sensor

See Quickstep in Controls schemes. A factory installed CO_2 sensor can be added to the unit to adjust ventilation on a CO_2 parts per million demand. This sensor is mounted next to the return air inlet and is not a relay; it only provides feedback to the quick step controls to adjust motor speed and is not suitable to turn the unit on and off on CO_2 demand.

Dirty filter switches
Pressure differential switches wired in series provide an alarm when pressure across the filter bank drops below a field adjustable set point (on the sensor). Wired into the IOM boards IN 6 and ION IN COM 6 terminals, the controls will send an alarm to BMS if one of the relays on the sensors opens. In cases where BMS is not available, this option can still be used by removing the two tan wires from P3 and field wiring them to operate a warning light or other alarm method.

Figure 7

Variable Frequency Drives (VFD)
Variable frequency drives control the blower speed based on a 2-10 VDC output signal from the ERVO controls (FEC OUT 8 and FEC OUT 9) in order to meet a user set CFM setpoint. JCI DC* line of drives manufactured by Eaton are used for their flexibility, ease of wiring, and reliability. Refer to the drives manual, included with the ERV, for further technical specifications and information.

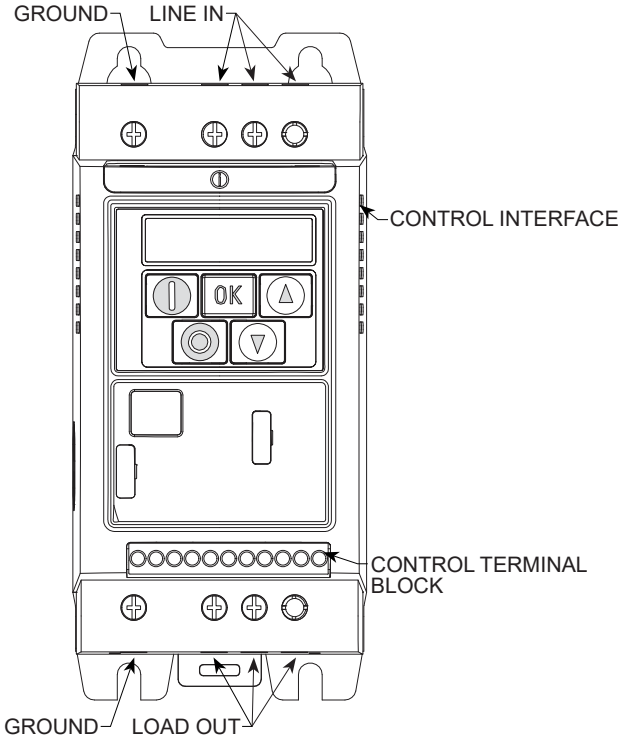


Figure 8

Wheel Type
While the standard energy recovery wheel absorbs both sensible and latent heat, a sensible only wheel can be ordered for applications where the sensible portion of the heat load needs to be removed from a space without returning the humidity.

Electric Preheat
The electric preheat mounts in the OA sector of the ERV before the filters and wheel. Electric Pre-heat gets the High Voltage power from the Junction Box installed in the Return Door. **See Figure 5 on Page 3.** Control is handled through the units controller via an output signal from FEC OUT7 and OCOM7. ERV Controller sends a dry contact to the Preheater Controls Contactor. **See Chart on Page 11**.

Roof Curb
Roof curbs can be ordered in 14" or 24" heights, insulated or non-insulated, **See dimensions on Page 12** for details.

Smoke detector
Smoke detectors can be factory ordered with the ERV. A qualified technician needs to field wire the smoke detector into the controls at TS-2 7 and 8 to turn unit off in case of alarm. **See Figure 4.**

Power disconnect
Available as factory option, field installed, sized to the ERVO minimum circuit ampacity (MCA).

GFI Service Outlet
A 120 VAC GFCI service outlet is shipped loose for field installation. Requires a separate power source so power is available when unit main disconnect is turned off for servicing.

Flow / Blower Speed Adjustment

Blower speed selection is accomplished by changing the sheave setting on both fresh air and exhaust air blowers. To set ERV for the required air flow (CFM), the external static pressure applied to the ERV (duct static) must be known. See the CFM vs External Static Pressure chart for the appropriate unit to determine the correct blower RPM for the specified CFM and External Static Pressure.

After blower speed adjustments have been made, ensure that when the belt is replaced it is tensioned correctly. The motor mounting plate can be adjusted to tension the belt. If using a belt tension checker, adjust the span to the appropriate setting and check the belt defection force. The belt deflection force should be between 5-8 lbs or the lowest tension at which the belt will not slip under peak load conditions.

XII - System Check

1. Disconnect main power
2. On units controlled by thermostats turn T-stat fan switch to "On". Otherwise jump terminal 6 to terminal 9.
3. Restore power to unit, observe ERV wheel rotation and both fresh air and exhaust air blowers.
4. Verify the ERV three phase blower motors are phased sequentially ensuring correct rotation and operation. If both blowers are running backwards:
   A. Disconnect Power.
   B. Reverse and two high voltage line in wires on the ERV's fuse block.

C. Reapply Power.

Note: Blower Motor rotation is checked in factory. Do not switch wires at contactors or on motors if blowers are spinning backwards at startup.

5. Verify that both blower motors are operating under their full load AMP rating (FLA). The FLA can be found on each motor and on the unit's name plate. Reading must be taken with doors closed.
6. Verify that the fresh air and exhaust air motorized dampers (if selected as options) are opening and closing when unit turns on/off.
7. Return damper settings. When tied into an HVAC system, manually adjust the position of the field installed dampers to balance Air flow.
8. Static test ports are provided to verify intake and exhaust CFM. These ports can also be used with a temperature probe to verify temperature transfer through the wheel.

Adjustment to the blower speed is accomplished by changing the sheave setting on both fresh air and exhaust air blowers.

XIII - Maintenance

1. All motors use lubricated sealed bearings; no further lubrication is necessary.
2. Make visual inspection of motors, belts and wheel rotating bearings during routine maintenance.
3. Check gaskets for wear
4. Check and replace filters, check Wheel segments for dirt build up.
5. Several pie-shaped segments are seated on stops between the segment retainer which pivots on the wheel rim and is 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**). Remove segment and wash with water and/or mild detergent.
6. To install wheel segments, follow steps A through E. **See Figure 9.** Reverse procedure for segment removal.
   A. Unlock two segment retainers (one on each side of the selected segment opening.
   B. With the embedded stiffener facing the motor side, insert the nose of the segment between the hub plates.
   C. Holding segment by the two outer corners, press the segment towards the center of the wheel and inwards against the spoke flanges. If hand pressure does not fully seat the segment, insert the flat tip of a screw driver between the wheel rim and outer corners of the segment and apply downward force while guiding the segment into place.
   D. Close and latch each segment retainer under segment retaining catch.
   E. Slowly rotate the wheel 180°. Install the second segment opposite the first for counterbalance. Rotate the two installed segments 90° to balance the wheel while the third segment is installed. Rotate the wheel 180° again to install the fourth segment opposite the third. Repeat this sequence with the remaining four segments.

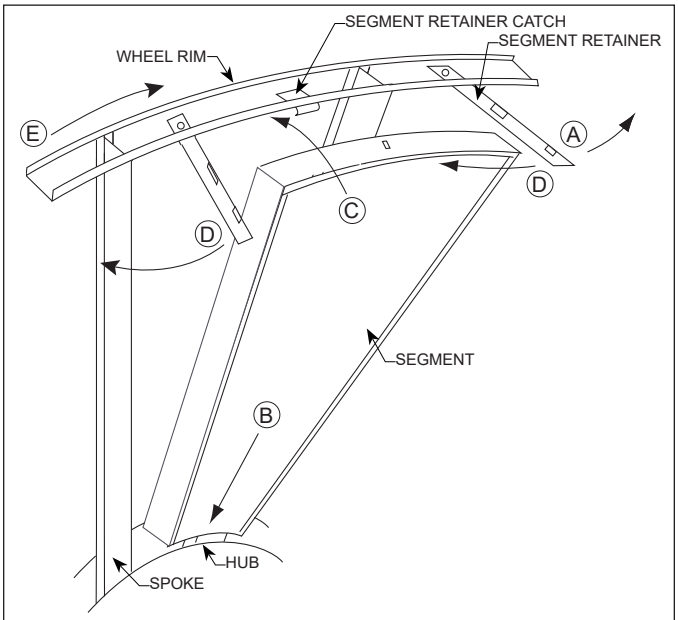


Figure 9

XIV - Pulley Kit Installation

The units are shipped from the factory with a pulley combination that meets the specified CFM selected when ordering the Unit. Pulley kits are available if duct or pressure calculations were incorrect and the CFM or pressures are out of range. To install a pulley kit.

1. Check content of pulley kit. If pulley kit contains:
   A. An adjustable sheave and a fixed pitch pulley, then remove belt and both motor and blower pulley.
   B. An adjustable sheave, then remove the motor pulley.
   C. A fixed pitch pulley, then remove the blower pulley.
2. Replace pulley(s) with the pulley(s) from pulley kit. Make sure each pulley is installed with a key. Tighten the set screw on the pulley(s) to 100 in.lb.
3. Install the belt that came with the pulley kit. Tension belt as explained in the blower speed adjustment section.
4. Check the speed of the blower. Adjust the motor sheave to increase or decrease the speed of the blower. See blower adjustment section. **See Blower Adjustment Section.**

XV - Sequence of Operation

1. The thermostat or Building Management System (BMS) sends a 24 Volt AC signal to the HVAC system for cooling, heating, fan only or ventilation operation.
2. The ERV is activated simultaneously with the blower of the AC system. The intake air blower, the exhaust blower, and the enthalpy wheel motor of the ERV are activated. These motors will remain energized as long as the blower in the AC system is energized and the outdoor conditions are adequate for energy recovery.
3. If the optional motorized intake air damper is present, the damper must open causing a proving switch to close in order to energize the intake air blower (10-20 seconds after the exhaust blower and enthalpy wheel have started).
4. If the optional low ambient option is selected, and the temperature leaving the exhaust side of the enthalpy wheel is lower than the field adjusted set point in the controls, the motorized fresh air damper will close and the intake blower will de-energize. The exhaust blower and enthalpy wheel motor will continue to operate until the temperature sensor registers a 16F rise, at this point the enthalpy wheel should be defrosted and the motorized damper will open and the fresh air blower will reactivate. (**See Optional Kits for details on low ambient**)
5. If the start, stop, jog [Climate Smart] option is active and outside conditions are adequate for free cooling the enthalpy wheel motor will stop for 10 minutes to allow for cool air to enter the building. It will then start or jog the wheel for 1 minute to keep dirt from building up on the wheel.

Communications.

The unit communication baud rate is set at 38400. The MAC Address and device instance is set to customer specifications per job. Communication is established by connecting to the terminal block labeled Bacnet. It is connected using an MS/TP network.

Bacnet Mapping

The unit ships with different set of parameters. These set are separated into 2 categories: "Control Points" and "Monitoring Points". "Control Points" are those that are intended to control the unit's behavior. "Monitoring Points" are intended to monitor the unit's behavior.

Control points for the unit are meant to be overwritten by the customer and monitoring points are meant to be read only points to inspect the unit's functionality. The tables below show the different parameter set and the description for each parameter. These parameters can be accessed through the HMI display or through a Bacnet network.

Bacnet Mapping - Description (Control Points)

startUpInput
Parameter that is responsible for unit start up when it is controlled through a Bacnet network.

useCO2ControlMode
Parameter that sets the usage of CO_2 Control Mode. Use this parameter to activate or deactivate the use of the CO_2 Mode.

useLowAmbientMode
Parameter that sets the usage of the Low Ambient Mode. Use this parameter to activate or deactivate the use of the Low Ambient Mode.

laMinTemp
Parameter that sets the minimum temperature that the unit will use to engage the Low Ambient Mode.

saCFMSetPointInput
Parameter that sets the unit's supply air cfm set point. This input goes through validation sequence that sets the machine's set point to be within the COMO range.

eaCFMSetPointInput
Parameter that sets the machine's exhaust cfm set point. This input goes through validation sequence that sets the machine's set point to be within the CFM range.

co2SetPointInput
Parameter that sets the unit's CO_2 set point. This input goes through validation that sets the unit's set point to be within the CO_2 range.

oaTempSetPoint
Parameter that sets the unit's outside air temperature when the unit is shipped with the Pre-Heat Option enabled.

Bacnet Mapping

Bacnet Mapping - Description (Monitoring Points)

Firmware_Ver
Firmware Version

startUp
Start Up Flag. This indicates if the unit is in operation.

occupied
Occupied Flag. This indicates if the unit received an occupied signal.

saCFMSetPoint
Supply CFM Validated Set Point.

saSetPointOutOfRange
Supply Air CFM Set Point Out Of Range Alarm

saCFMValue
Supply Air CFM Value.

eaCFMSetPoint
Exhaust Air CFM Validated Set Point.

eaSetPointOutOfRange
Exhaust Air CFM Set Point Out Of Range Alarm

eaCFMValue
Exhaust Air CFM Value.

co2SetPoint
CO_2 Validated Set Point.

co2SetPointOutOfRange
CO_2 Set Point Out Of Range Alarm

co2Value
CO_2 Value.

oaTempValue
Outside Air Temperature Value.

saTempValue
Supply Air Temperature Value.

raTempValue
Return Air Temperature Value.

eaTempValue
Exhaust Air Temperature Value.

eaDPValue
Differential Pressure value across the wheel in the exhaust air and return air quadrants.

saDPValue
Differential Pressure value across the wheel in the supply air and outside air quadrants.

smokeControlMode
Smoke Control Flag. This indicates if the unit is running in Smoke Control Mode.

laControlMode
Low Ambient Control Flag. This indicates if the unit is running in Low Ambient Control Mode.

co2ControlMode
CO_2 Control Flag. This indicates if the unit is running in CO_2 Control Mode.

preHeatMode
Pre-Heat Mode Control Flag. This indicates that the unit is running in Pre-Heat Mode Control. This mode is optional.

wheelModulationMode
Wheel Modulation Mode Control Flag. This indicates that the unit is running in Wheel Modulation Mode Control. This mode is optional.

ssjControlMode
Start Stop Jog Control Flag. This indicates if the unit is running in Start Stop Jog Control Mode. This mode is optional.

saVFDStatus
Supply Air VFD Status.

eaVFDStatus
Exhaust Air VFD Status.

mehStatus
Motorized Exhaust Air Hood Status.

mohStatus
Motorized Outside Air Hood Status.

wheelStatus
Wheel Status.

saVFDFailureAlarm
Supply Air VFD Failure Alarm. This indicates if the Supply Air VFD has failed.

eaVFDFailureAlarm
Exhaust Air VFD Failure Alarm. This indicates if the Exhaust Air VFD has failed.

mehFailureAlarm
Motorized Exhaust Air Hood Alarm. This indicates if the Motorized Exhaust Hood has failed.

mohFailureAlarm
Motorized Outside Air Hood Failure Alarm. This indicates if the Motorized Outside Air Hood has failed.

wheelFailureAlarm
Wheel Failure Alarm. This indicates if the Wheel has failed.

dirtyFilterAlarm
Dirty Filter Alarm. This indicates that the filter on the air quadrant is dirty and needs replacement.

Start Up Suitability (Standard)

This program is responsible for the startup operation of the unit. The unit is operated utilizing any of following two methods:

1. Bacnet start up (Optional). This is an option that is used to gain control over the unit through a Bacnet network. In order for the unit to operate, the "startUpInput" parameter must be set to true.
2. Occupancy signal start up. The unit can be operated by supplying a 24VAC signal to the occupied input in the terminal block labeled as "occ" and "com".

If any of the two methods: "startUpInput" parameter or "occupancy" input signal are true the sequence of operation is as follows:

1. The program sets the "startUp" parameter to true to indicate that the unit is ready to operate.
2. The unit turns on the wheel.
3. The unit turns on motorized outside air damper.
4. The unit turns on motorized exhaust air damper.
5. The unit checks for the motorized dampers to be opened.
6. If the damper statuses are satisfied, the unit will turn the blowers on.

Set Point Validation (Available for units with VFD)

This program is responsible for the validations of the user's inputted set points. It is important to note that the user's inputted set points, "saCFMSetPointInput", "eaCFMSetPointInput" and "co2SetPointInput", are not the machine's validated set points "saCFMSetPoint", "eaCFMSetPoint" and "co2SetPoint". The user's inputted set points go through a validation block that compares the inputted set points to the unit's max and min CFM capabilities. If the inputted set point is greater than the max CFM of the unit, the validation block will modify the machine's set point to the max CFM of the particular unit. If the inputted set point is below the machine's minimum CFM, the validation block will modify the machine's set point to the minimum CFM of the particular unit. Likewise, the CO_2 set point will be validated to be within 0-2000 ppm.

When the unit detects that the set points are outside the unit's range, it will set the alarm parameters "saSetPointOutOfRange", "eaSetPointOutOfRange" and "co2SetPointOutOfRange" to true respectively.

As a rule of thumb, if the machine's set points differ from the user's inputted set points, the user should check that the set points are not outside the machine' s operating range or that the unit is not engaged in a control mode.

Smoke Control (Optional)

This program is responsible for the request of "Smoke Control Mode". The "Smoke Control Mode" is a program that checks for the existence of smoke on the return air stream. When this mode is engaged, the unit will:

1. Set the "smokeControlMode" to true to indicate that the unit is running on "Smoke Control Mode".
2. Turn off motorized outside air damper to prevent more oxygen to be fed in the case of a fire.
3. Turn off the supply air blower to prevent more oxygen to be fed in case of a fire.
4. If equipped with a pivoting wheel, the wheel will pivot out of the air stream to prevent contamination.
5. Set the exhaust air blower speed to 90% in order to exhaust the smoke out of the system.

6. Once this mode is disengaged the unit will:
    a. Turn off the exhaust air blower.
    b. If equipped with a pivoting wheel, return the wheel to its normal operating position.
    c. Open the motorized outside air damper.
    d. Check for the motorized outside air damper to be open. If satisfied, the unit will:
        i. Turn on the supply blower.
        ii. Turn on the exhaust blower.

Low Ambient Control Mode (Standard)

This program is responsible for the request of the "Low Ambient Control Mode". "Low Ambient Control Mode" is a mode of operation that monitors the exhaust air temperature and compares to the user input parameter "laMinTemp" as a method of frost control. When this mode is engaged the unit will:

1. Set the "laControlMode" parameter to true to indicate that the unit is running on this mode.
2. Shut down the motorized outside air damper and the supply blower to avoid supplying more cold air that could cause frost on the energy wheel.
3. The exhaust air CFM set point is set to the max CFM value that the unit can handle, in order to utilize the return air as the defrosting agent for the energy wheel.
4. Once the mode is disengaged, the motorized outside air damper and the supply blower will return to their normal operation and the exhaust CFM will be returned to the user's inputted set point.

This mode will only engage if "Smoke Control Mode" is not active. Once the unit engages in "Low Ambient Control Mode", the exhaust air temperature will have to rise above "laMinTemp" by 16°F in order to disengage the mode.

Pre-Heat Control Mode (Optional)

This program is responsible for the control of the outside air temperature that is supplied to the unit. The program monitors the inputted outside air temperature set point "oaTempSetPoint". When the temperature falls below the set point, the unit will:

1. Check that there is air flow through the unit by checking an air proving switch located at the supply air quadrant.
2. If the air flow is confirmed:
    a. The unit will set the parameter "preHeatMode" to true to indicate that the unit is running on this mode.
    b. The unit will enable the electrical heating coil located at the outside air quadrant.

This mode will only engage if "Smoke Control" or "Low Ambient Control" is not active. Once the unit engages in this mode, the temperature will have to rise above "oaTempSetPoint" by 2°F in order to

CO_2 Control Mode (Available for Units with VFD)

This program is responsible for monitoring the CO_2 content in the return air stream and the request for the "CO_2 Control Mode" on the unit. The "CO_2 Control Mode" inspects the CO_2 level and compares it to the validated CO_2 set point ("co2SetPoint"). If the space CO_2 is greater or equal to the set point, the "CO_2 Control Mode" is requested. When this mode is engaged, the unit will:

1. Sets the parameter "co2ControlMode" to true to indicate that the unit is running on this mode.
2. Overwrite the supply and exhaust CFM set point to the unit's max CFM range.
3. The unit will continue on this mode until the space CO_2 has been brought below the set point minus a CO_2dead band of 10 ppm.

This mode will only engage if "Low Ambient Control Mode" or "Smoke Control Mode" is not active. Once the mode is disengaged, the supply and exhaust CFM set points will return to the user's inputted set points.

Economizer (Free Cool) Modes

The unit could ship with free cool mode listed below:

1. Start Stop Jog Mode (Optional)

This program is responsible for a free cool mode where the wheel is stopped and then turned on in intervals in order to stop energy transfer between the air streams entering and leaving the unit. This happens when the conditions of the outside air are favorable for "free cooling". The program monitors the outside air temperature to determine if the unit should be engaged in the mode. The sequence of operations is as follows:

a. The program checks if the unit is on "startUp" :
    i. If "startUp" is satisfied, the unit then:
        1. Compares the outside air temperature to be within 65 and 40°F.
            a. If the range is satisfied, the unit then :
                i. Sets the parameter "ssjControlMode" to true to indicate that the unit is running on this mode.
                ii. Turns off the wheel for 10 minutes.
                iii. After 10 minutes has passed, it turns the wheel on for 1 minute.
                iv. Repeat the cycle until the unit is out of the mode.

The mode will disengage when the unit outside air is out of the range by 2 degrees in either direction. This mode will only engage if "Low Ambient Control Mode", "Smoke Control Mode"or "CO_2 Control Mode" is not active.

Electric Pre Heat Data								
Unit	No. of Stages	Input					Heating Section	
		Volts	kW	Temperature Rise (deg F)		Btuh	Minimum Circuit Ampacity	MOCP (TUTCO)
ERV-20	1	240	3	15.8	4.7	10,237	9.02	15
		480					4.51	15
		575					3.77	15
	2	240	6	15.8	9.5	20,473	18.04	20
		480					9.02	15
		575					7.53	15
ERV-28	1	240	6	15.8	6.8	20,473	18.04	20
		480					9.02	15
		575					7.53	15
	2	240	12	19.0	13.5	40,946	36.09	40
		480					18.04	20
		575					15.06	20
ERV-36	1	240	6	9.5	5.3	20,473	18.04	20
		480					9.02	15
		575					7.53	15
	2	240	12	19.0	10.5	40,946	36.09	40
		480					18.04	20
		575					15.06	20
	3	240	18	20.3	15.8	61,419	54.13	60
		480					27.06	20
		575					22.59	20
ERV-46	1	240	8	8.4	5.5	27,298	24.06	25
		480					12.03	15
		575					10.04	15
	2	240	16	16.9	11.0	54,595	48.11	50
		480					24.06	25
		575					20.08	25
	3	-	24	20.0	16.5	81,892	-	-
		480					36.09	40
		575					30.12	35
ERV-62	1	240	10	6.9	5.1	34,122	30.07	35
		480					15.04	20
		575					12.55	15
	2	240	19.9	13.7	10.1	67,902	59.84	60
		480					29.92	30
		575					24.98	25
	3	-	30	17.6	15.3	102,365	-	-
		480					45.11	50
		575					37.65	40

Control Schematic with Contactors

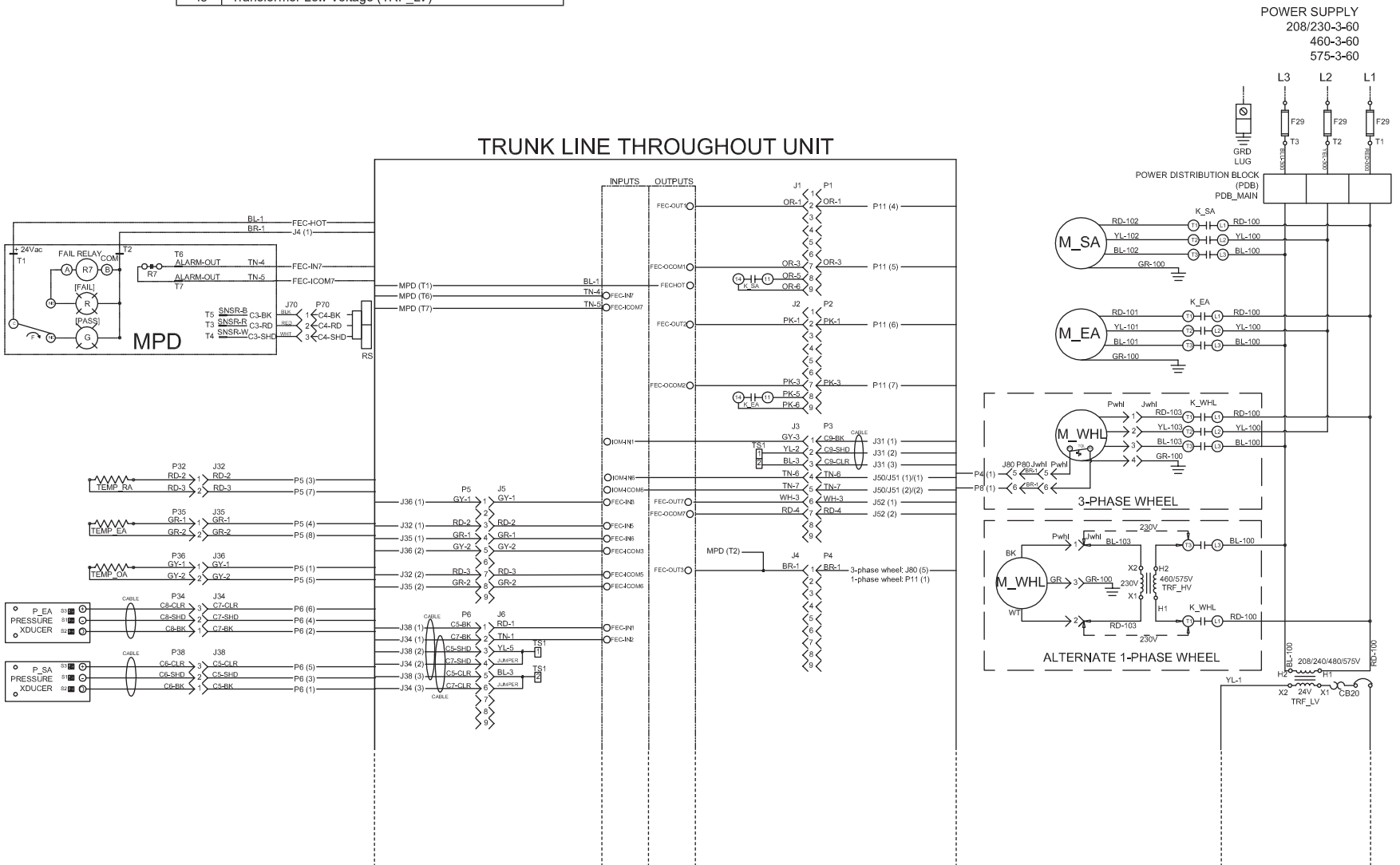
Component Code

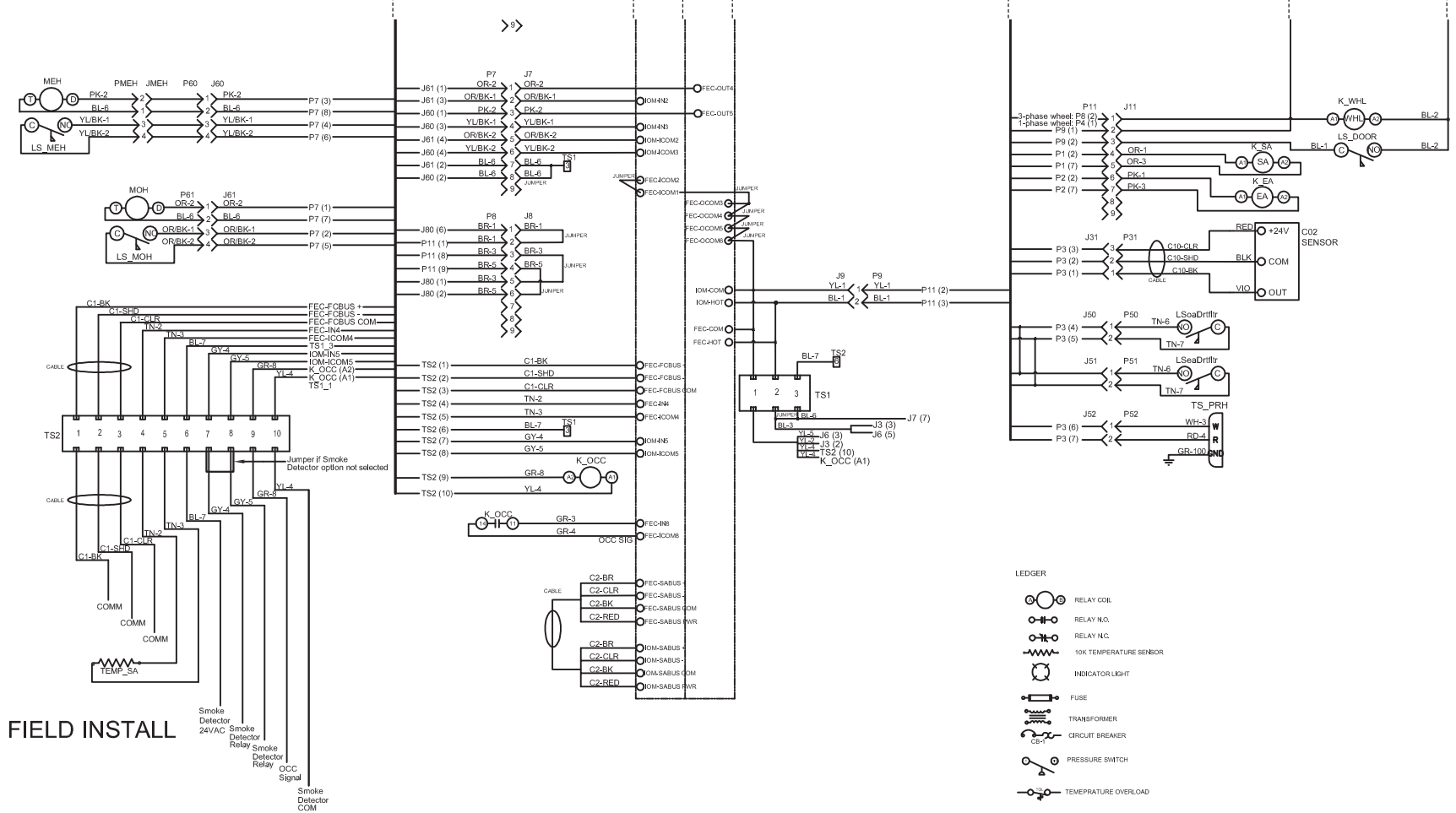
Line #	Outputs
39,52	1-phase Wheel Contactor (K_WHL)
37	1-phase Wheel Motor (M_WHL)
36	1-phase wheel transformer (TRF_HV)
27,52	3-phase Wheel Contactor (K_WHL)
27	3-phase Wheel Motor (M_WHL)
63	CO2 Sensor
53	Door Limit Switch (LS_DOOR)
23,57	Exhaust Air Contactor (K_EA)
69	Exhaust Air Dirty Filter Limit Switch (LSeaDrtfltr)
20	Exhaust Air Motor (M_EA)
66	Outside Air Dirty Filter Limit Switch (LSoaDrtfltr)
74	Pre Heat Terminal Strip (TS_PRH)
15,55	Supply Air Contactor (K_SA)
14	Supply Air Motor (M_SA)
70	Terminal Strip 1 (TS1)
43	Transformer Low Voltage (TRF_LV)

Line #	Inputs
40	Exhaust Air Pressure Transducer (P_EA)
32	Exhaust Air Temperature Sensor (TEMP_EA)
20	Missing Pulse Detector (MPD)
51	Motorized Exhaust Hood Damper (MEH)
53	Motorized Exhaust Hood Damper Limit Switch (LS_MEH)
58	Motorized Outside Hood Damper (MOH)
60	Motorized Outside Hood Damper Limit Switch (LS_MOH)
75,78	Occupancy Relay (K_OCC)
35	Outside Air Temperature Sensor (TEMP_OA)
29	Return Air Temperature Sensor (TEMP_RA)
19	RS (Rotation Sensor)
44	Supply Air Pressure Transducer (P_SA)
87	Supply Air Temperature Sensor (TEMP_SA)
73	Terminal Strip 2 (TS2)

Wire Color Code

BK	Black
BL	Blue
GR	Green
GY	Gray
OR	Orange
PK	Pink
RD	Red
WT	White
YL	Yellow




MEH
PMEH
JMEH
P60
J60
LS_MEH
MOH
P61
J61
LS_MOH
P7
J7
P8
J8
TS1
TS2
JUMPER
CABLE
FEC-FCBUS +
FEC-FCBUS -
FEC-FCBUS COM
FEC-IN4
FEC-ICOM4
TS1_2
IOM-IN5
IOM-ICOM5
K_OCC (A2)
TS1_1
C1-BK
C1-SHD
C1-CLR
TN-2
TN-3
BL-7
GY-4
GY-5
GR-8
YL-4
Jumper if Smoke Detector option not selected
COMM
TEMP_SA
K_OCC
GR-3
GR-4
OCC SIG
FEC-IN8
FEC-ICOM8
C2-BR
C2-CLR
C2-BK
C2-RED
FEC-SABUS
FEC-SABUS COM
FEC-SABUS PWR
IOM-SABUS
IOM-SABUS COM
IOM-SABUS PWR
Smoke Detector 24VAC
Smoke Detector Relay
OCC Signal
Smoke Detector COM
FIELD INSTALL
IOM-IN2
IOM-IN3
IOM-ICOM2
IOM-ICOM3
FEC-ICOM2
FEC-ICOM1
FEC-OUT4
FEC-OUT5
FEC-OCOM3
FEC-OCOM4
FEC-OCOM5
FEC-OCOM6
IOM-COM
IOM-HOT
FEC-COM
FEC-HOT
J9
P9
P11
J11
J31
P31
J50
P50
J51
P51
J52
P52
K_WHL
LS_DOOR
K_SA
K_EA
C02 SENSOR
C10-CLR
C10-SHD
C10-BK
LSoaDrtlfr
TS_PRH
3-phase wheel: P8 (2)
1-phase wheel: P4 (1)
P9 (1)
P9 (2)
P1 (2)
P1 (7)
P2 (2)
P2 (7)
P3 (3)
P3 (2)
P3 (1)
P3 (4)
P3 (5)
P3 (6)
P3 (7)
J3 (3)
J6 (5)
J7 (7)
J6 (3)
J3 (2)
TS2 (10)
K_OCC (A1)
LEDGER
RELAY COIL
RELAY N.O.
RELAY N.C.
10K TEMPERATURE SENSOR
INDICATOR LIGHT
FUSE
TRANSFORMER
CIRCUIT BREAKER
PRESSURE SWITCH
TEMEPRATURE OVERLOAD

Control Schematic with VFDs

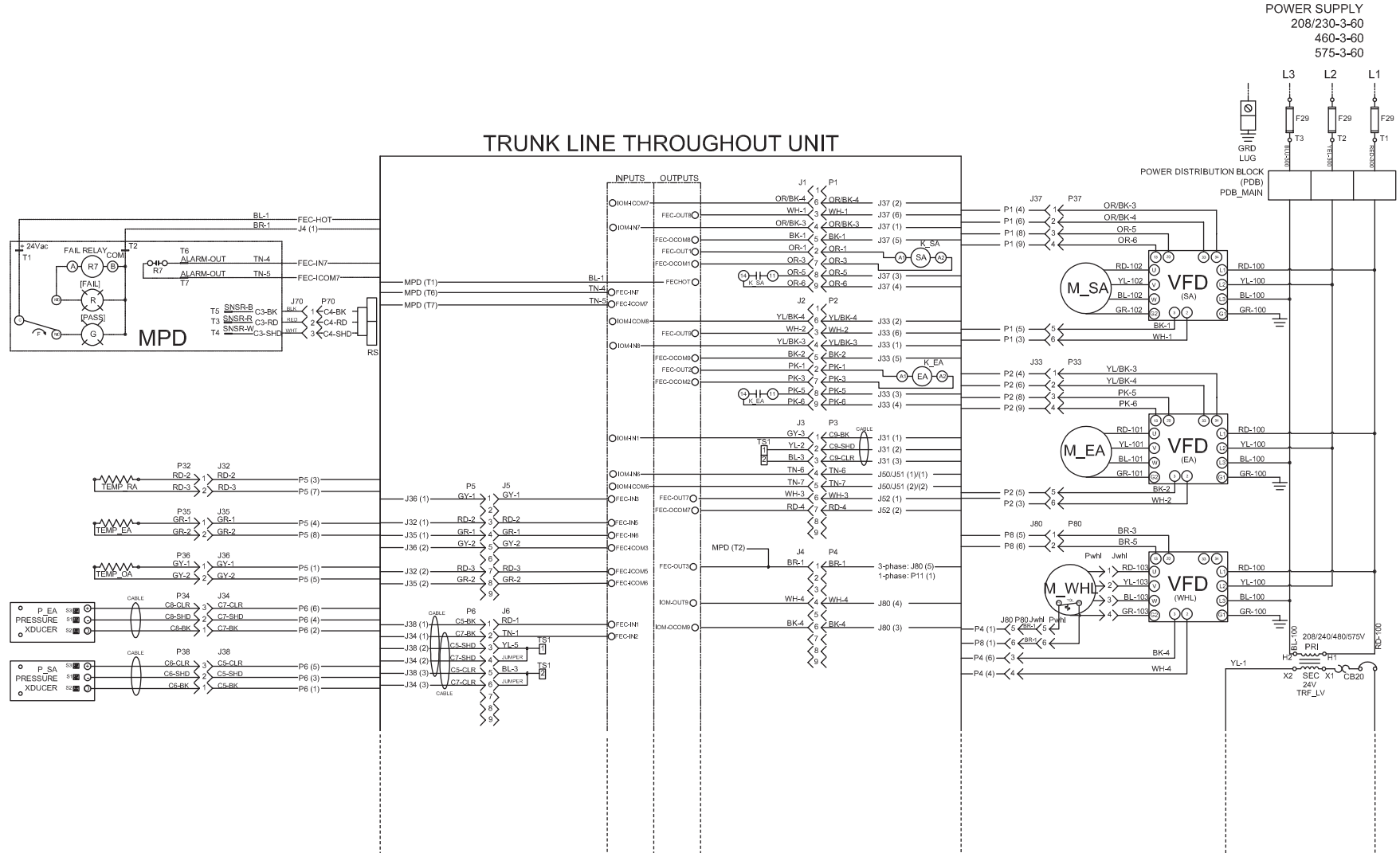
Component Code

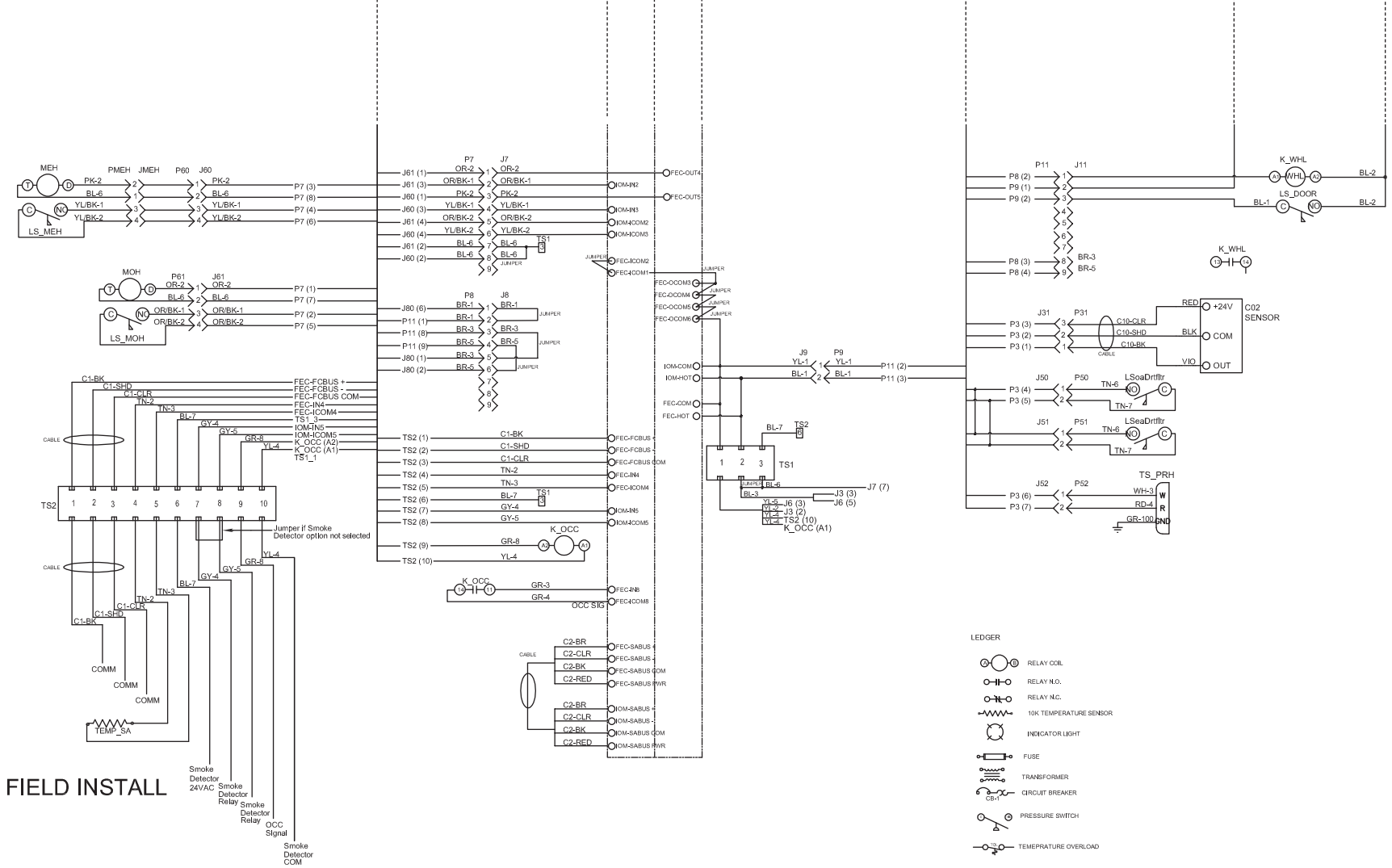
Line #	Outputs
63	CO2 Sensor
52	Door Limit Switch (LS_DOOR)
68	Exhaust Air Dirty Filter Limit Switch (LSeaDrtfltr)
29	Exhaust Air Motor (M_EA)
22,23	Exhaust Air Relay (K_EA)
30	Exhaust Air Variable Frequency Drive (VFD_EA)
65	Outside Air Dirty Filter Limit Switch (LSoaDrtfltr)
74	Pre Heat Terminal Strip (TS_PRH)
17	Supply Air Motor (M_SA)
14,15	Supply Air Relay (K_SA)
18	Supply Air Variable Frequency Drive (VFD_SA)
70	Terminal Strip 1 (TS1)
42	Transformer Low Voltage (TRF_LV)
38	Wheel Motor (M_WHL)
50,56	Wheel Relay (K_WHL)
39	Wheel Variable Frequency Drive (VFD_WHL)

Line #	Inputs
40	Exhaust Air Pressure Transducer (P_EA)
32	Exhaust Air Temperature Sensor (TEMP_EA)
20	Missing Pulse Detector (MPD)
51	Motorized Exhaust Hood Damper (MEH)
53	Motorized Exhaust Hood Damper Limit Switch (LS_MEH)
58	Motorized Outside Hood Damper (MOH)
60	Motorized Outside Hood Damper Limit Switch (LS_MOH)
75,78	Occupancy Relay (K_OCC)
35	Outside Air Temperature Sensor (TEMP_OA)
29	Return Air Temperature Sensor (TEMP_RA)
19	RS (Rotation Sensor)
44	Supply Air Pressure Transducer (P_SA)
87	Supply Air Temperature Sensor (TEMP_SA)
73	Terminal Strip 2 (TS2)

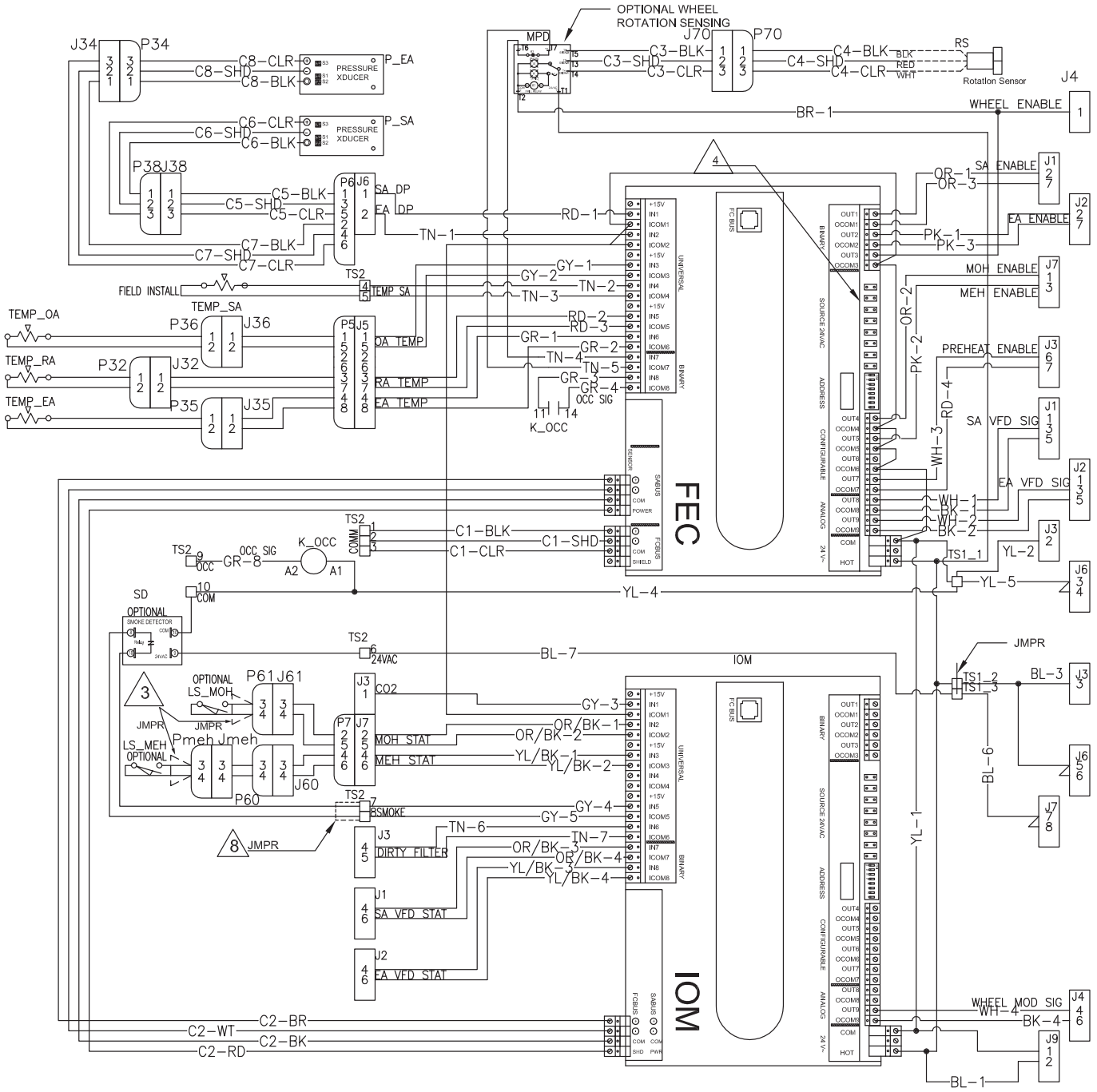
Wire Color Code

BK	Black
BL	Blue
GR	Green
GY	Gray
OR	Orange
PK	Pink
RD	Red
WT	White
YL	Yellow




MEH
LS_MEH
MOH
LS_MOH
TEMP_SA
FIELD INSTALL
Smoke Detector 24VAC
Smoke Detector Relay
Smoke Detector Relay
OCC Signal
Smoke Detector COM
Jumper if Smoke Detector option not selected
K_OCC
K_WHL
LS_DOOR
C02 SENSOR
+24V
COM
OUT
LSoaDrtFltr
TS_PRH
LEDGER
RELAY COIL
RELAY N.O.
RELAY N.C.
10K TEMPERATURE SENSOR
INDICATOR LIGHT
FUSE
TRANSFORMER
CIRCUIT BREAKER
PRESSURE SWITCH
TEMEPRATURE OVERLOAD

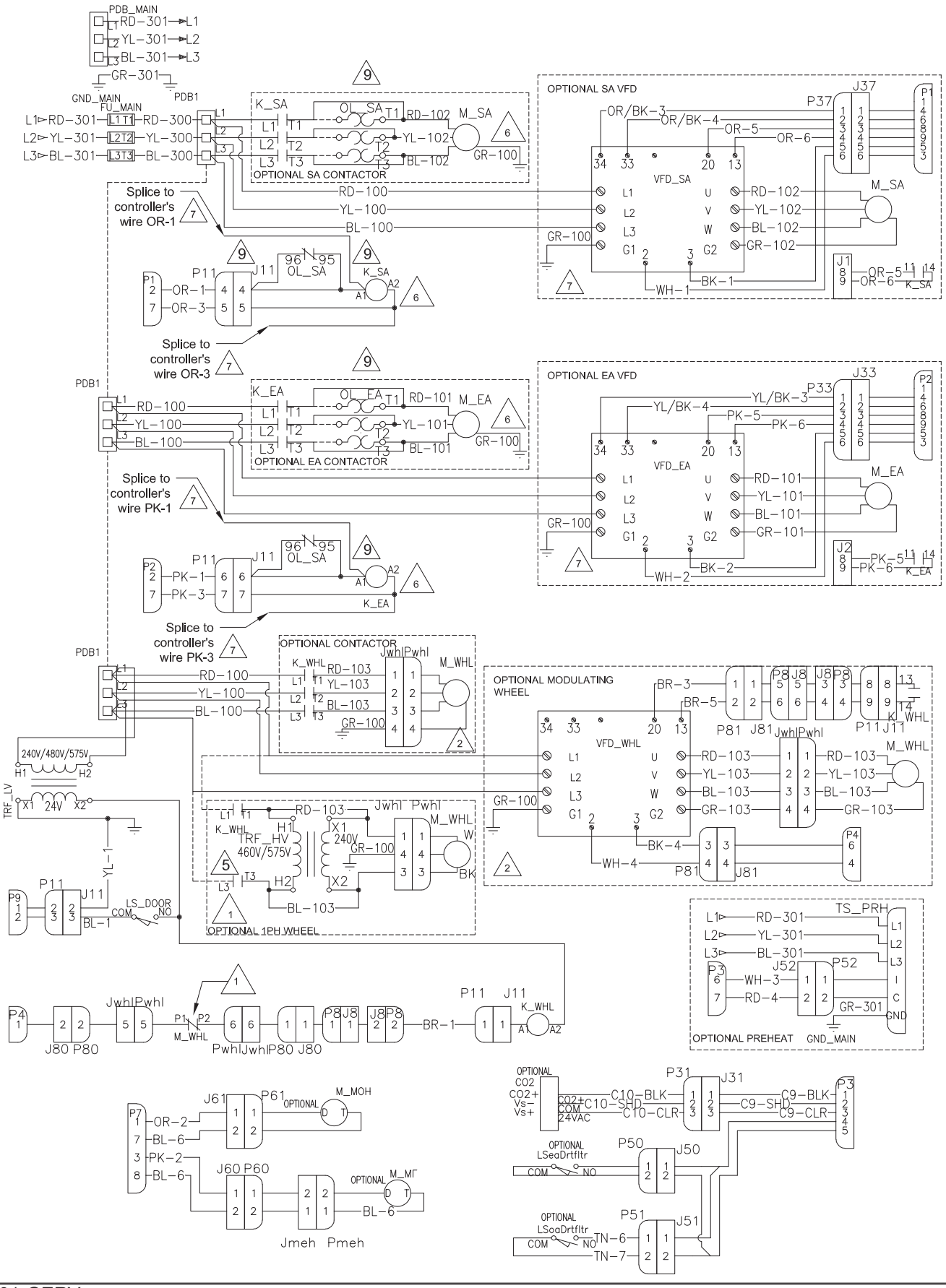
Unit Wiring



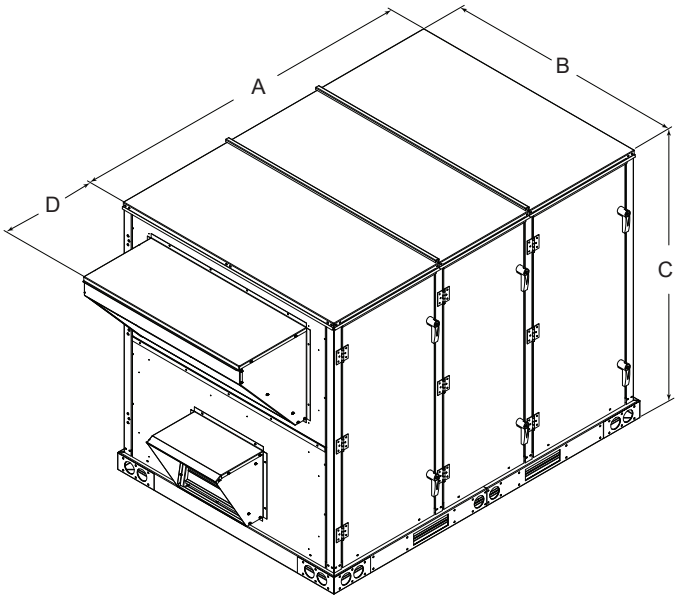
Notes:

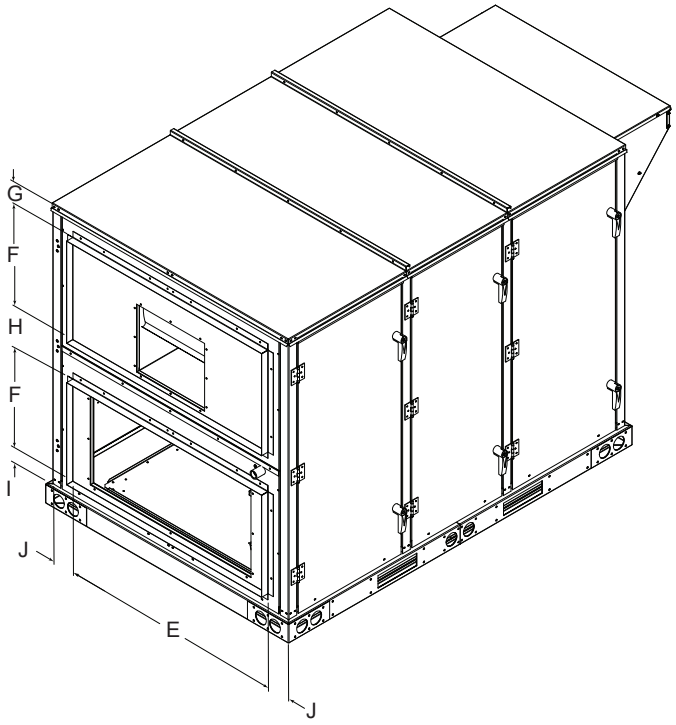
1. If NC Switch for over heat protection is not present, short both wires' ends together.
3. Jumpers needed for non-motorized damper.
4. Position jumper 13-16 to inside position to have dry contact for VFD.
5. Transformer is for 460V/575V power only. Wire direct for 240V.
6. For contactor option.
7. For VFD option
8. Jumper only if smoke detector option not selected.
9. OL_xx are needed for size 80, 120 only. Omit wire from J11 to K_xx.

Unit Wiring


PDB_MAIN
RD-301
YL-301
BL-301
GR-301
GND_MAIN
FU_MAIN
PDB1
K_SA
OL_SA
M_SA
OPTIONAL SA CONTACTOR
OPTIONAL SA VFD
VFD_SA
Splice to controller's wire OR-1
Splice to controller's wire OR-3
K_EA
OL_EA
M_EA
OPTIONAL EA CONTACTOR
OPTIONAL EA VFD
VFD_EA
Splice to controller's wire PK-1
Splice to controller's wire PK-3
OPTIONAL CONTACTOR
K_WHL
M_WHL
OPTIONAL MODULATING WHEEL
VFD_WHL
240V/480V/575V
TRF_LV
TRF_HV
460V/575V
OPTIONAL 1PH WHEEL
LS_DOOR
TS_PRH
OPTIONAL PREHEAT
GND_MAIN
M_MOH
M_MF
Jmeh Pmeh
OPTIONAL CO2
OPTIONAL LSeaDrtfltr
J80 P80
PwhlJwhlP80 J80
P81 J81

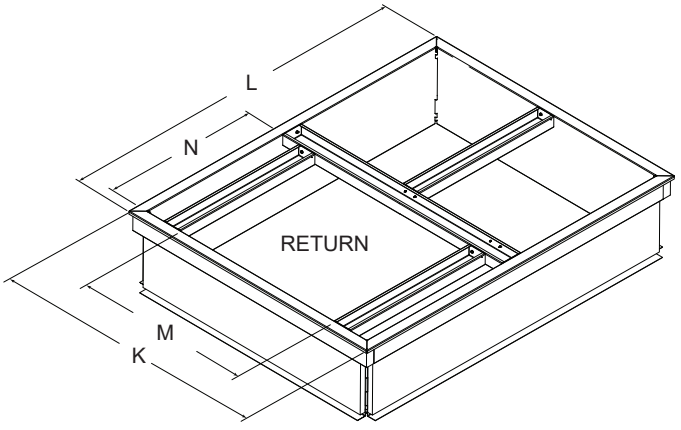
Over / Under - ERV / Curb Dimensions





ERV OUTSIDE DIMENSIONS				
UNIT	**A**	**B**	**C**	**D**
ERVO 20	68.50	50.20	48.00	11.50
ERVO 28	70.50	50.20	51.00	18.75
ERVO 36	70.50	56.20	58.00	18.75
ERVO 46	79.50	56.20	61.00	18.00
ERVO 62	85.50	62.20	71.00	19.50

ERV DUCT CONNECTIONS (SIDE BY SIDE OR RETURN)						
UNIT	**E**	**F**	**G**	**H**	**I**	**J**
ERVO 20	31.90	15.60	4.00	5.25	8.25	8.25
ERVO 28	37.90	17.40	3.00	6.00	5.25	5.25
ERVO 36	37.90	19.80	4.00	6.75	8.25	8.25
ERVO 46	45.10	20.50	4.50	8.00	4.75	4.75
ERVO 62	52.10	23.20	7.00	9.75	4.25	4.25



CURB DIMENSIONS (AVAILBABLE IN 14" OR 24" HIGH)				
UNIT	**K**	**L**	**M**	**N**
ERVO 20	44.50	62.75	24.50	27.250
ERVO 28	44.50	64.75	32.50	28.25
ERVO 36	50.50	64.75	32.50	28.25
ERVO 46	50.50	73.75	38.50	32.75
ERVO 62	56.50	79.75	41.00	35.75

ERVO 20 - SUPPLY AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
500	LAU BL A9-6AT	NA	NA	1011	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
600		NA	NA	1078	0.28	1225	0.28	NA	NA	NA	NA	NA	NA	NA	NA
800		NA	NA	1211	0.42	1338	0.42	1567	0.70	NA	NA	NA	NA	NA	NA
1000		NA	NA	1341	0.56	1454	0.70	1660	0.98	1848	1.12	2023	1.40	NA	NA
1200		NA	NA	1465	0.84	1569	0.84	1759	1.26	1933	1.54	2094	1.68	NA	NA
1400		NA	NA	1585	1.26	1682	1.40	1860	1.68	2023	1.96	2175	2.24	NA	NA
1600		NA	NA	1701	1.68	1792	1.82	1961	2.10	2116	2.52	NA	NA	NA	NA

ERVO 20 - EXHAUST AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
500	LAU BL A9-4A FB	NA	NA	976	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
600		NA	NA	1039	0.14	1182	0.28	NA	NA	NA	NA	NA	NA	NA	NA
800		NA	NA	1169	0.42	1289	0.42	1511	0.56	NA	NA	NA	NA	NA	NA
1000		NA	NA	1304	0.56	1406	0.70	1600	0.84	1782	0.98	1952	1.26	NA	NA
1200		NA	NA	1442	0.84	1530	0.98	1700	1.12	1863	1.40	2018	1.54	2167	1.82
1400		NA	NA	1583	1.26	1660	1.40	1811	1.54	1957	1.82	2098	2.10	2234	2.24
1600		NA	NA	1725	1.68	1794	1.82	1929	2.10	2061	2.38	2189	2.52	NA	NA

ERVO 28 - SUPPLY AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1500	LAU BL 10-10AT	NA	NA	1116	0.70	1221	0.84	NA	NA	NA	NA	NA	NA	NA	NA
1700		NA	NA	1176	0.98	1274	1.12	NA	NA	NA	NA	NA	NA	NA	NA
1900		NA	NA	1231	1.12	1323	1.26	1495	1.68	NA	NA	NA	NA	NA	NA
2200		NA	NA	1313	1.54	1396	1.68	1556	2.10	1704	2.52	NA	NA	NA	NA
2400		NA	NA	1370	1.82	1449	2.10	1599	2.52	1742	2.80	1877	3.22	NA	NA
2600		NA	NA	1424	2.24	1498	2.38	1641	2.80	1778	3.22	1908	3.78	NA	NA
2800		NA	NA	1479	2.66	1549	2.80	1684	3.22	1815	3.78	NA	NA	NA	NA

ERVO 28 - EXHAUST AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1500	LAU BL A10-10A FB	NA	NA	1116	0.70	1221	0.84	NA	NA	NA	NA	NA	NA	NA	NA
1700		NA	NA	1176	0.98	1274	1.12	NA	NA	NA	NA	NA	NA	NA	NA
1900		NA	NA	1231	1.12	1323	1.26	1495	1.68	NA	NA	NA	NA	NA	NA
2200		NA	NA	1313	1.54	1396	1.68	1556	2.10	1704	2.52	NA	NA	NA	NA
2400		NA	NA	1370	1.82	1449	2.10	1599	2.52	1742	2.80	1877	3.22	NA	NA
2600		NA	NA	1424	2.24	1498	2.38	1641	2.80	1778	3.22	1908	3.78	NA	NA
2800		NA	NA	1549	2.80	1684	3.22	1815	3.78	NA	NA	NA	NA	NA	NA

ERVO 36 - SUPPLY AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	LAU BL 12-9AT	NA	NA	927	0.98	1008	1.12	1155	1.40	1289	1.82	NA	NA	NA	NA
2200		NA	NA	966	1.26	1042	1.40	1184	1.68	1313	2.10	1432	2.38	NA	NA
2600		NA	NA	1044	1.68	1113	1.96	1244	2.38	1364	2.66	1477	3.08	1583	3.50
2800		NA	NA	1081	2.10	1147	2.24	1273	2.66	1389	3.08	1499	3.50	1602	3.92
3000		NA	NA	1118	2.38	1181	2.66	1302	3.08	1415	3.50	1521	3.92	1622	4.34
3400		NA	NA	1190	3.22	1249	3.36	1361	3.92	1467	4.34	1568	4.90	NA	NA
3600		NA	NA	1226	3.64	1283	3.92	1392	4.34	1494	4.90	NA	NA	NA	NA

ERVO 36 - EXHAUST AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	LAU BL A12-9A FB	NA	NA	927	0.98	1008	1.12	1155	1.40	1289	1.82	NA	NA	NA	NA
2200		NA	NA	966	1.26	1042	1.40	1184	1.68	1313	2.10	1432	2.38	NA	NA
2600		NA	NA	1044	1.68	1113	1.96	1244	2.38	1364	2.66	1477	3.08	NA	NA
2800		NA	NA	1081	2.10	1147	2.24	1273	2.66	1389	3.08	1499	3.50	NA	NA
3000		NA	NA	1118	2.38	1181	2.66	1302	3.08	1415	3.50	1521	3.92	NA	NA
3400		NA	NA	1190	3.22	1249	3.36	1361	3.92	1467	4.34	1568	4.90	NA	NA
3600		NA	NA	1226	3.64	1283	3.92	1392	4.34	1494	4.90	NA	NA	NA	NA

ERVO 46 - SUPPLY AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	LAU BL 12-12AT	NA	NA	1002	1.82	1074	2.10	1210	2.52	1336	2.94	1454	3.50	NA	NA
3200		NA	NA	1031	2.10	1100	2.38	1231	2.80	1354	3.36	1469	3.78	NA	NA
3600		NA	NA	1094	2.66	1158	2.94	1280	3.50	1395	4.06	1504	4.62	NA	NA
3800		NA	NA	1123	3.08	1185	3.36	1303	3.92	1414	4.48	1521	5.04	NA	NA
4000		NA	NA	1154	3.36	1214	3.64	1328	4.34	1436	4.90	1540	5.46	NA	NA
4400		NA	NA	1213	4.20	1270	4.48	1378	5.18	1480	5.88	NA	NA	NA	NA
4600		NA	NA	1243	4.76	1299	5.04	1404	5.74	1503	6.30	NA	NA	NA	NA

ERVO 46 - EXHAUST AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	LAU BL A12-12A FB	NA	NA	1002	1.82	1074	2.10	1210	2.52	1336	2.94	1454	3.50	NA	NA
3200		NA	NA	1031	2.10	1100	2.38	1231	2.80	1354	3.36	1469	3.78	NA	NA
3600		NA	NA	1094	2.66	1158	2.94	1280	3.50	1395	4.06	1504	4.62	NA	NA
3800		NA	NA	1123	3.08	1185	3.36	1303	3.92	1414	4.48	1521	5.04	NA	NA
4000		NA	NA	1154	3.36	1214	3.64	1328	4.34	1436	4.90	1540	5.46	NA	NA
4400		NA	NA	1213	4.20	1270	4.48	1378	5.18	1480	5.88	1578	6.44	NA	NA
4600		NA	NA	1243	4.76	1299	5.04	1404	5.74	1503	6.30	NA	NA	NA	NA

ERVO 62 - SUPPLY AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4600	LAU BL 15-15A	NA	NA	883	3.22	941	3.64	1050	4.34	1154	5.18	1252	6.02	NA	NA
4800		NA	NA	901	3.50	956	3.92	1063	4.76	1154	5.46	1260	6.44	1352	7.42
5200		NA	NA	937	4.20	990	4.62	1091	5.46	1187	6.30	1279	7.28	1367	8.26
5400		NA	NA	954	4.62	1005	5.04	1104	5.88	1198	6.72	1288	7.70	1375	8.68
5600		NA	NA	973	4.90	1023	5.32	1119	6.30	1211	7.14	1299	8.26	1384	9.24
6000		NA	NA	1009	5.74	1057	6.16	1149	7.14	1236	8.12	1321	9.10	NA	NA
6200		NA	NA	1025	6.16	1072	6.72	1163	7.56	1249	8.68	NA	NA	NA	NA

ERVO 62 - EXHAUST AIR PERFORMANCE RATINGS															
AIR VOLUME (CFM)	BLOWER	EXTERNAL STATIC PRESSURE (In. w.g.)													
		0	0	0.25	0.25	0.50	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50	2.50
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4600	LAU BL15-15A FB	NA	NA	883	3.22	941	3.64	1050	4.34	1154	5.18	1252	6.02	NA	NA
4800		NA	NA	901	3.50	956	3.92	1063	4.76	1154	5.46	1260	6.44	NA	NA
5200		NA	NA	937	4.20	990	4.62	1091	5.46	1187	6.30	1279	7.28	NA	NA
5400		NA	NA	954	4.62	1005	5.04	1104	5.88	1198	6.72	1288	7.70	NA	NA
5600		NA	NA	973	4.90	1023	5.32	1119	6.30	1211	7.14	1299	8.26	NA	NA
6000		NA	NA	1009	5.74	1057	6.16	1149	7.14	1236	8.12	1321	9.10	NA	NA
6200		NA	NA	1025	6.16	1072	6.72	1163	7.56	1249	8.68	NA	NA	NA	NA

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START UP INFORMATION SHEET

VOLTAGE - ERV 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.