



INSTALLATION MANUAL

CONDITIONING ENERGY RECOVERY VENTILATOR (CERV)

MODEL CERV-001-PARTA, CERV-001-PARTB



BUILD EQUINOX
SUPPORT@BUILDEQUINOX.COM
(773)-492-1893

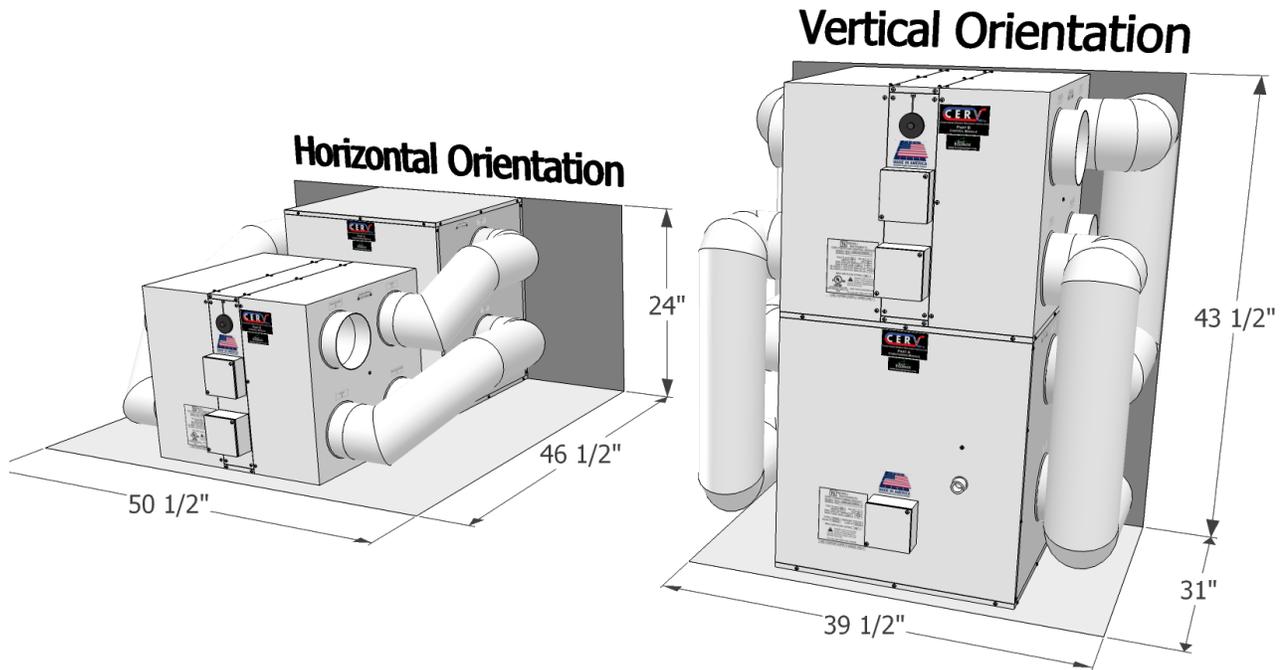
REV 0.51 - 06/22/2016

CONTENTS

Specifications.....	4
CERV System Footprint	4
Nameplate Ratings.....	4
General Considerations.....	5
Installation Procedure.....	6
Ducting The Units Together	6
Filters	8
Insulating	9
Water Drain	10
Electrical	11
General Wiring Guidelines	11
Electrical Installation.....	11
Auxiliary Heater Option	16
Wireless Ventilation Switch Option.....	17
Starting and Commissioning the System	18
Wireless TouchScreen Controller	18
Heat Pump Operation	18
ECM Fan Speed Configuration.....	19
Appendix - Electrical	20

SPECIFICATIONS

CERV SYSTEM FOOTPRINT



NAMEPLATE RATINGS

 NEWELL INSTRUMENTS	
CERV CONDITIONING MODULE	
MODEL NO	<input type="text" value="CERV-001-PARTA"/>
SERIAL NO	<input type="text"/>
VOLTS AC	<input type="text" value="120"/>
AMPS	<input type="text" value="4.2"/>
PH ϕ	<input type="text" value="1"/>
Hz	<input type="text" value="60"/>
MIN CIRCUIT AMPACITY	<input type="text" value="8.75"/>
MAX FUSE SIZE (AMPS)	<input type="text" value="15"/>
TYPE	<input type="text" value="R134A"/>
AMOUNT	<input type="text" value="14.1 oz"/>
HIGH P	<input type="text" value="335psig"/>
LOW P	<input type="text" value="162psig"/>
MAX AIR FLOW (CFM)	<input type="text" value="300"/>
	WARNING: RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH: DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE SERVICING.
For use with CERV-001-PARTB	

 NEWELL INSTRUMENTS	
CERV FRESH AIR CONTROL MODULE	
MODEL NO	<input type="text" value="CERV-001-PARTB"/>
SERIAL NO	<input type="text"/>
VOLTS AC	<input type="text" value="120"/>
AMPS	<input type="text" value="2.5"/>
PH ϕ	<input type="text" value="1"/>
Hz	<input type="text" value="60"/>
MIN CIRCUIT AMPACITY	<input type="text" value="2.5"/>
MAX FUSE SIZE (AMPS)	<input type="text" value="15"/>
BLOWER 1 OUTPUT MAX (FLA)	<input type="text" value="1.1"/>
BLOWER 2 OUTPUT MAX (FLA)	<input type="text" value="1.1"/>
MAX AIR FLOW (CFM)	<input type="text" value="300"/>
	
LISTED	WARNING: RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH: DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE SERVICING.
ACCESSORY FOR DUCTED HEAT RECOVERY VENTILATOR 4VN8	NOT FOR OUTDOOR USE
For use with CERV-001-PARTA	

GENERAL CONSIDERATIONS



DANGER: RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH: DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE SERVICING.

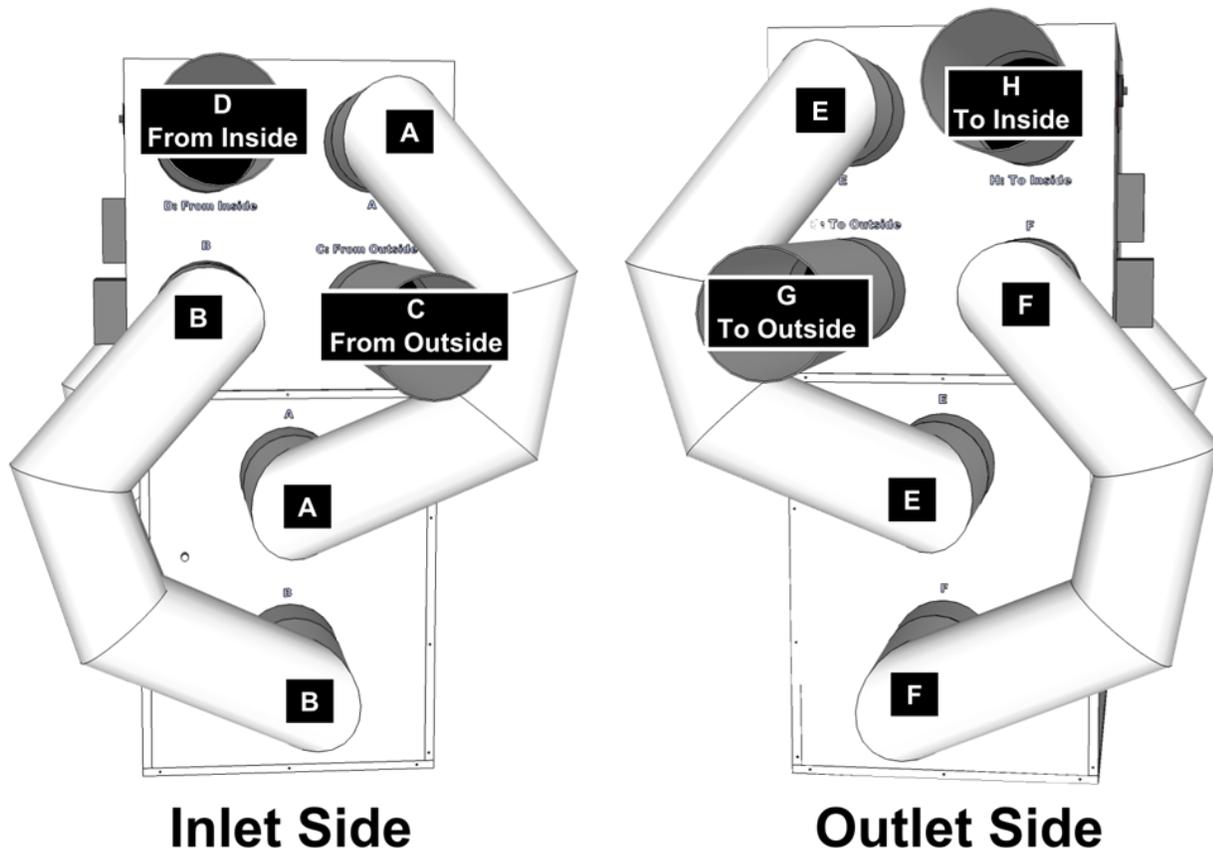
1. Please review entire manual before proceeding with installation. Improper installation or deviation from instructions can result in damage and warranty being voided.
2. Ensure that all components are on hand and free from defects or damage. Base CERV system consists of Part-A, Part-B, (2) inline fans, touchscreen controller, and touchscreen power supply. Review invoice for any additional options that may have been ordered.
3. Installation should be performed by qualified personnel with a thorough understanding of electrical safety precautions. Units must be properly grounded.
4. Beware of sharp edges when assembling duct connections and do not lift modules by duct fittings.
5. Units should be secure and level. If installing on a platform, ensure levelness and structural stability of the platform.
6. Fresh air inlet and exhaust outlet ducts to house from outside:
 - a. Must be sufficiently above ground to avoid blockage from snow or other obstructions. Two feet above ground is recommended.
 - b. Ducts to the outside must use a coarse screen or mesh to prevent insects, birds, etc from entering, but fine screens, dampers, flaps, etc should be removed so as to eliminate any restrictions.
 - c. If possible both inlet and exhaust should be on same side of house to avoid pressure differential, which can impact flow.
 - d. Inlet and exit ducts should be a minimum of 4' apart in any orientation. Inlet separation from any other possible sources of contamination should be considered and local codes followed.
7. Ducts must be insulated as directed in ducting section. Improper or insufficient duct insulating can lead to condensation and staining and/or water damage.
8. Water drain must be lower than the drain outlet from the CERV-001-PARTA module. If not, a condensate pump must be used.
9. An inline water trap must be effectively utilized as detailed later to prevent air from being drawn into the CERV-001-PARTA unit through the drain tubing.

INSTALLATION PROCEDURE

1. Review Ducting section below to determine most applicable ducting scheme. The two modules Part A and Part B can be stacked vertically (most common) or set horizontally.
2. It is recommended to install the CERV-001-PARTA in a plastic appliance basin if location is such that water damage is a concern. A clogged condensate line can cause water to pool around CERV. A moisture sensor and alarm can also be used to notify occupant of a problem.
3. Fix CERV-001-PARTA and CERV-001-PARTB modules into position and ensure stability. **Units must be level.** Vibration feet (not provided) can be placed under CERV to reduce vibration and to keep CERV off of a potentially wet floor surface.
4. Determine locations for the blowers to inside and to outside (and if applicable, auxiliary heater) and filter boxes. Blowers should always be drawing air through the CERV, and blowing air to the supply/exhaust ducting. Mount blowers in position and ensure stability.

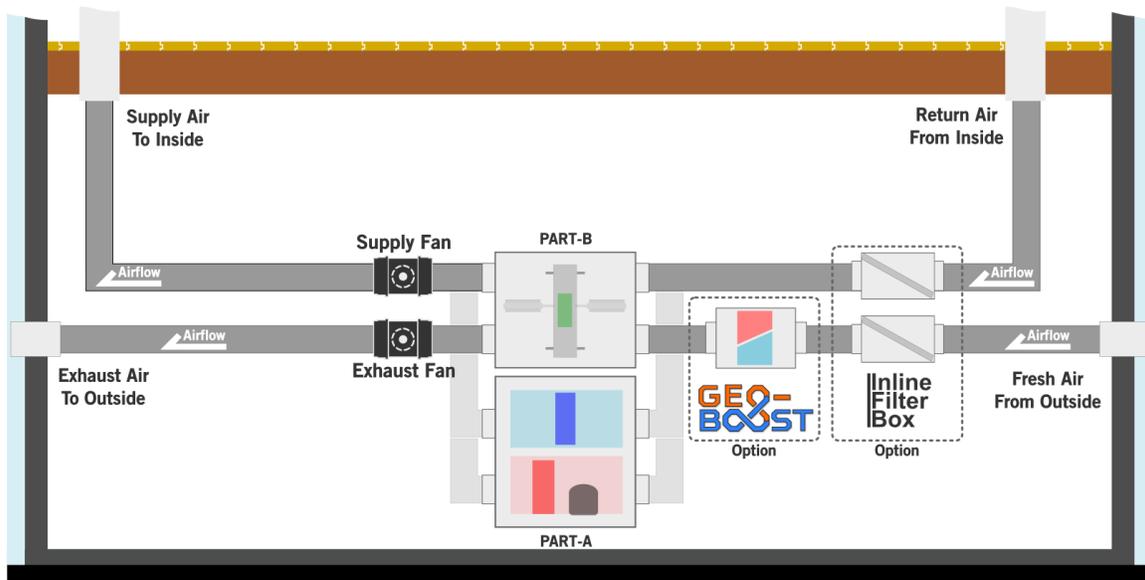
DUCTING THE UNITS TOGETHER

For ducting the PARTA and PARTB units together, rigid (galvanized) duct fittings should be used. All ducting between the units must be insulated and sealed, especially the outlet side, since the air will be heated or cooled (depending on the duct) and could cause condensation on the ducts.

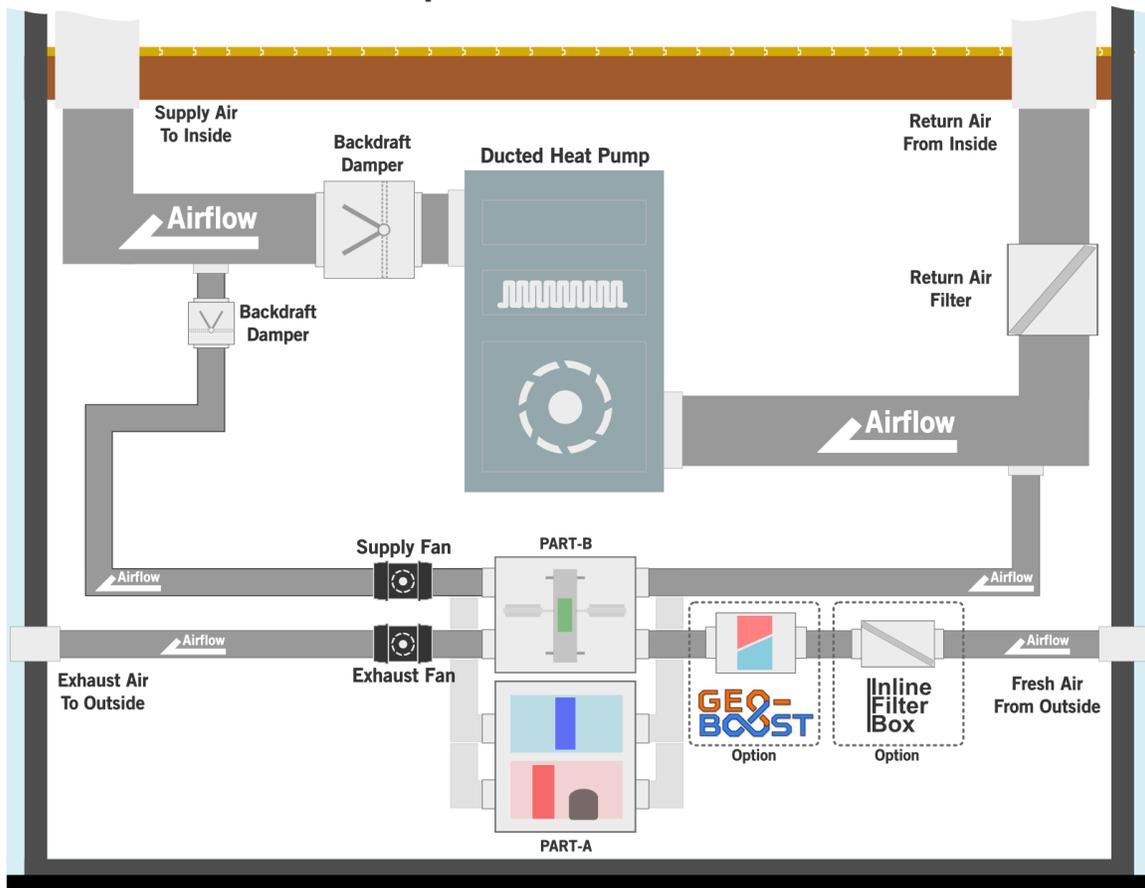


Due to the flexible nature of the system, there are several ways to duct the CERV for operation. See the following to determine the most applicable configuration.

Standard CERV Installation



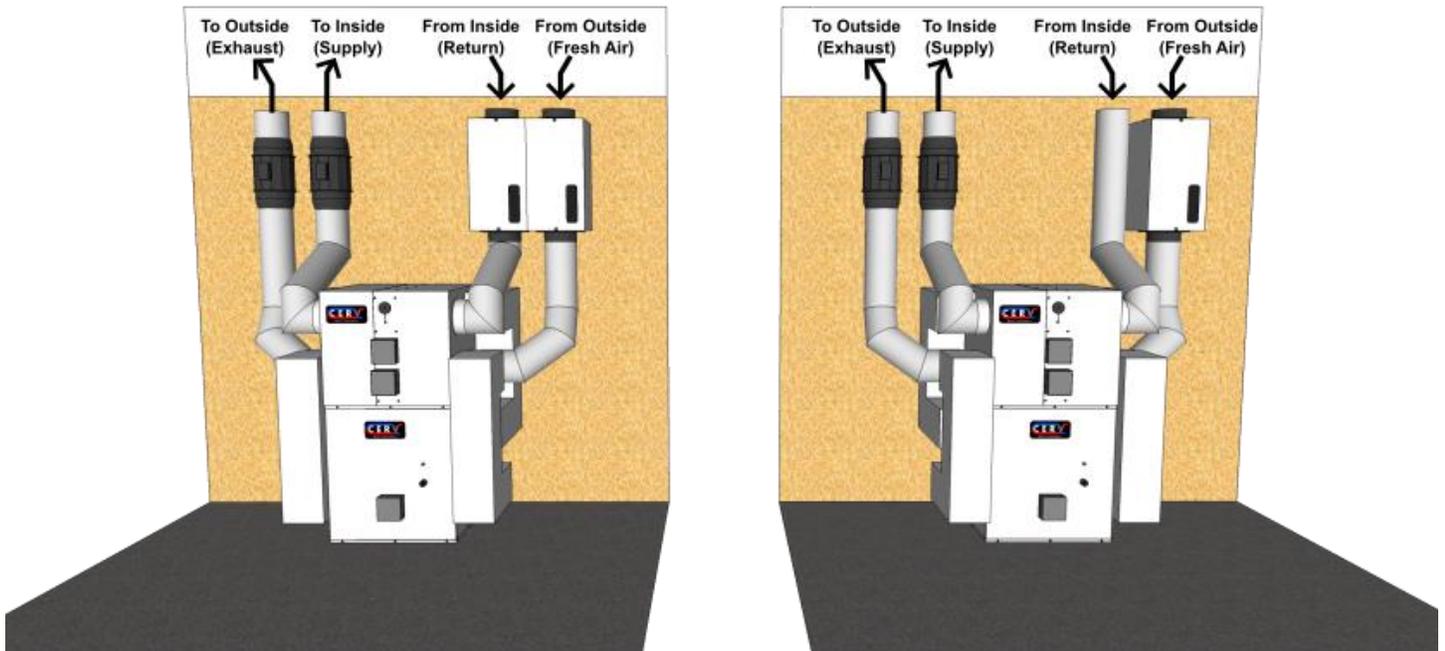
CERV & Ducted Heat Pump Installation



FILTERS

A filter must be installed in line with the system, so that the fresh air is filtered **before** it enters the CERV. Additionally, you may wish to filter the return air to remove dust or other particulates from the air when the CERV is in a recirculation mode. Both configurations are shown below.

Build Equinox offers two inline filter options for sale. An Insulated Filter Box that is suitable for filtering fresh air while preventing condensation and an Uninsulated filter box for the return air. The filter boxes use a standard 10" x 20" x 1" filter, allowing you to choose a filter level that suits your needs.



INSULATING

In the winter, the unit will be bringing in cold air, passing it through the heat pump, and then exhausting EVEN COLDER air. In the summer, the CERV will be bringing in hot air, passing through the heat pump, and exhausting EVEN HOTTER air. It is therefore extremely important that the components of the system are properly insulated, as to prevent any condensation on the ducting.

PART A AND PART B MODULES

The Part A (control module) and Part B (heat pump module) are internally insulated using a UL approved R8.0 insulation. The Part A and Part B modules therefore do not need to be insulated (with the exception of the duct fittings).

DUCTS

All ducts except for the RETURN (from inside) must be insulated. It is recommended to use a minimum of R6.0 insulation (such as 6" fiberglass ductwork insulation sleeve found at home improvement stores). In colder climates, it may be necessary to add additional insulation if it appears that the ducts may be showing signs of sweating.

FILTER BOXES

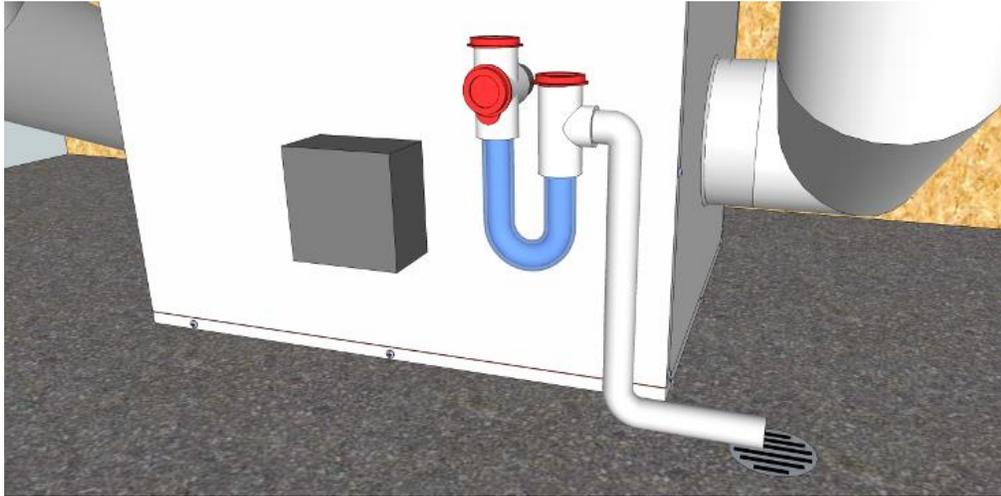
The Fantech FB6 filter box, if used in the fresh air supply line, must be insulated. If the Insulated Filter Box was purchased, no additional filter insulation is needed. It is recommended to use a minimum of R6.0 insulation surrounding the entire filter box (be sure to leave a way to replace the filter). If there are multiple filter boxes stacked together (such as one on top of the other), you **must** insulate between the two.

IN-LINE FANS

Both supply and exhaust fans must be insulated. It is recommended to use a minimum of R6.0 insulation surrounding each fan. If there are multiple fans stacked together (such as one on top of the other), you **must** insulate between the two with a double layer of insulation. In the winter, for instance, the supply fan may be blowing 80F air inside the house, while the exhaust fan may be blowing 30F air back outside. Without insulation between the two fans, therefore, the CERV's conditioning capabilities would be severely diminished.

WATER DRAIN

1. Part A has a 3/4" PVC condensate drain outlet, which must be connected.
2. **It is imperative to create a water trap** in the drain tube to prevent air flow through the condensate line which will inhibit proper condensate flow. It is recommended to use the EZ Trap sold by Build Equinox. This clear trap allows the water seal to be seen and also has clean out ports for easy maintenance.



3. After the water trap the drain line after can simply be run to a floor or other drain as long as it is below the trap level, otherwise a condensate pump must be used.

ELECTRICAL



DANGER: RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH: DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE SERVICING.

Electrical Ratings

CERV-001-PARTA

Volts AC	120
Amps	4.2
Ph Φ	1
Hz	60
Minimum Circuit Ampacity	8.75
Max Fuse Size (Amps)	15

CERV-001-PARTB

Volts AC	120
Amps	2.5
Ph Φ	1
Hz	60
Minimum Circuit Ampacity	2.5
Max Fuse Size (Amps)	15
Blower 1 Output Max (Fla)	1.1
Blower 2 Output Max (Fla)	1.1

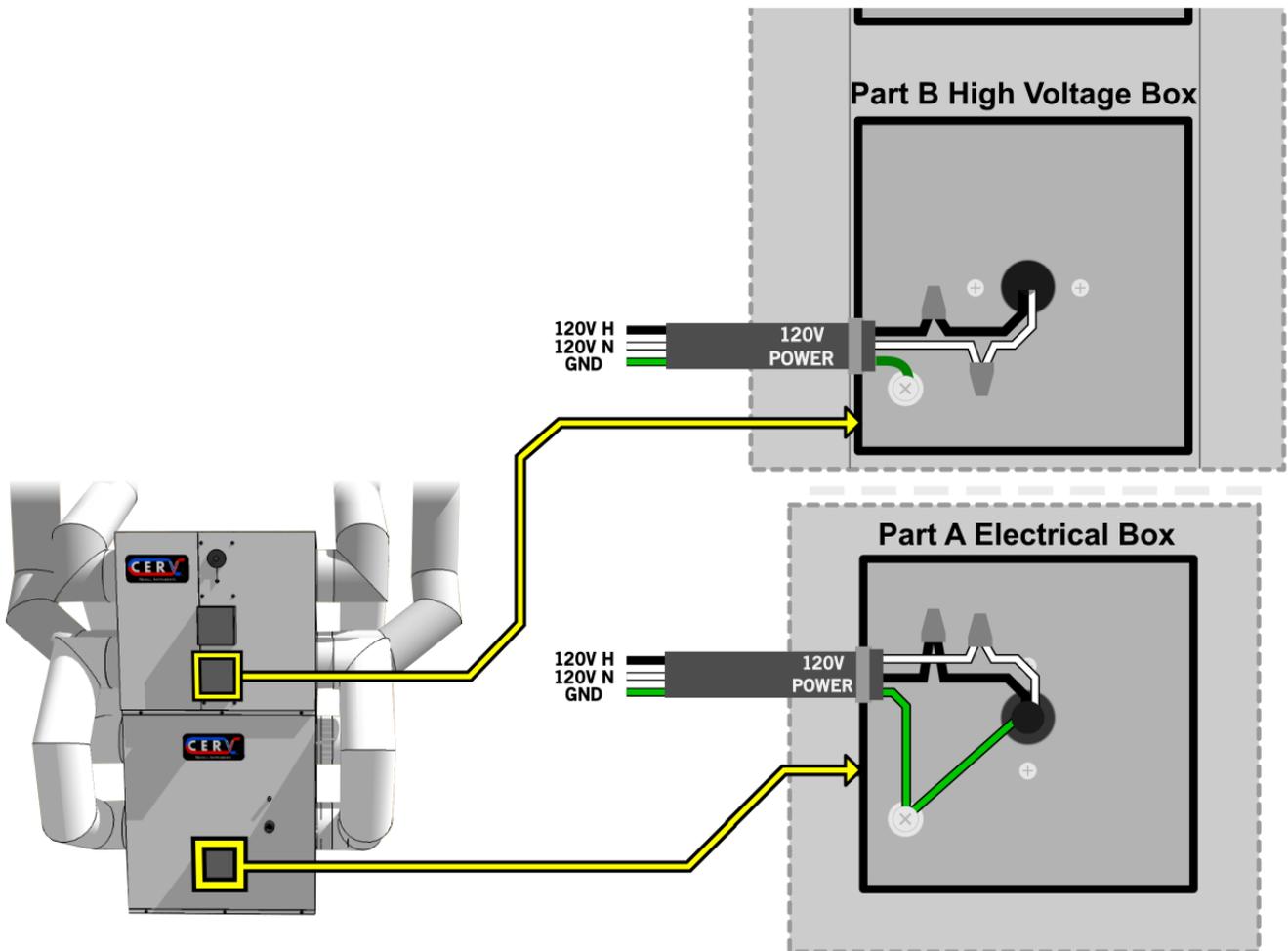
GENERAL WIRING GUIDELINES

- All electrical wiring should be performed as to comply with National Electric Code NFPA 70. Additionally, be aware of any additional city or utility code requirements before installation. Units must be properly grounded.
- System power to CERV-001-PARTA and PARTB must comply with the nameplate requirements.
- The CERV should have its own dedicated circuit if possible.
- Never run control wiring and power wiring through the same conduit.
- Always use proper gauge stranded copper wire for power connections.

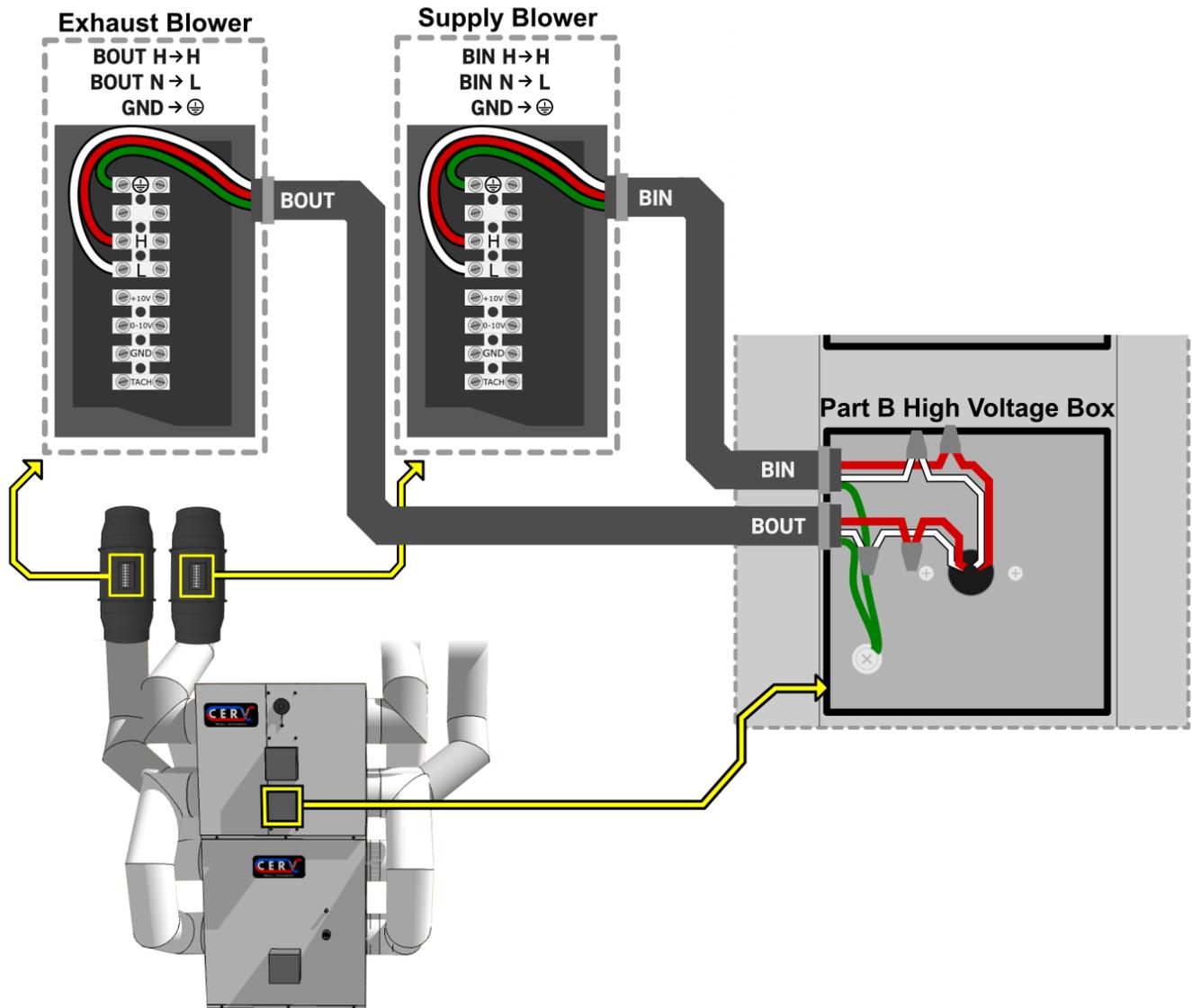
ELECTRICAL INSTALLATION

1. For further electrical information, see the Appendix at the end of the document.
2. MAKE SURE THE CIRCUIT IS NOT HOT, i.e. breaker switch is off or fuse is out.

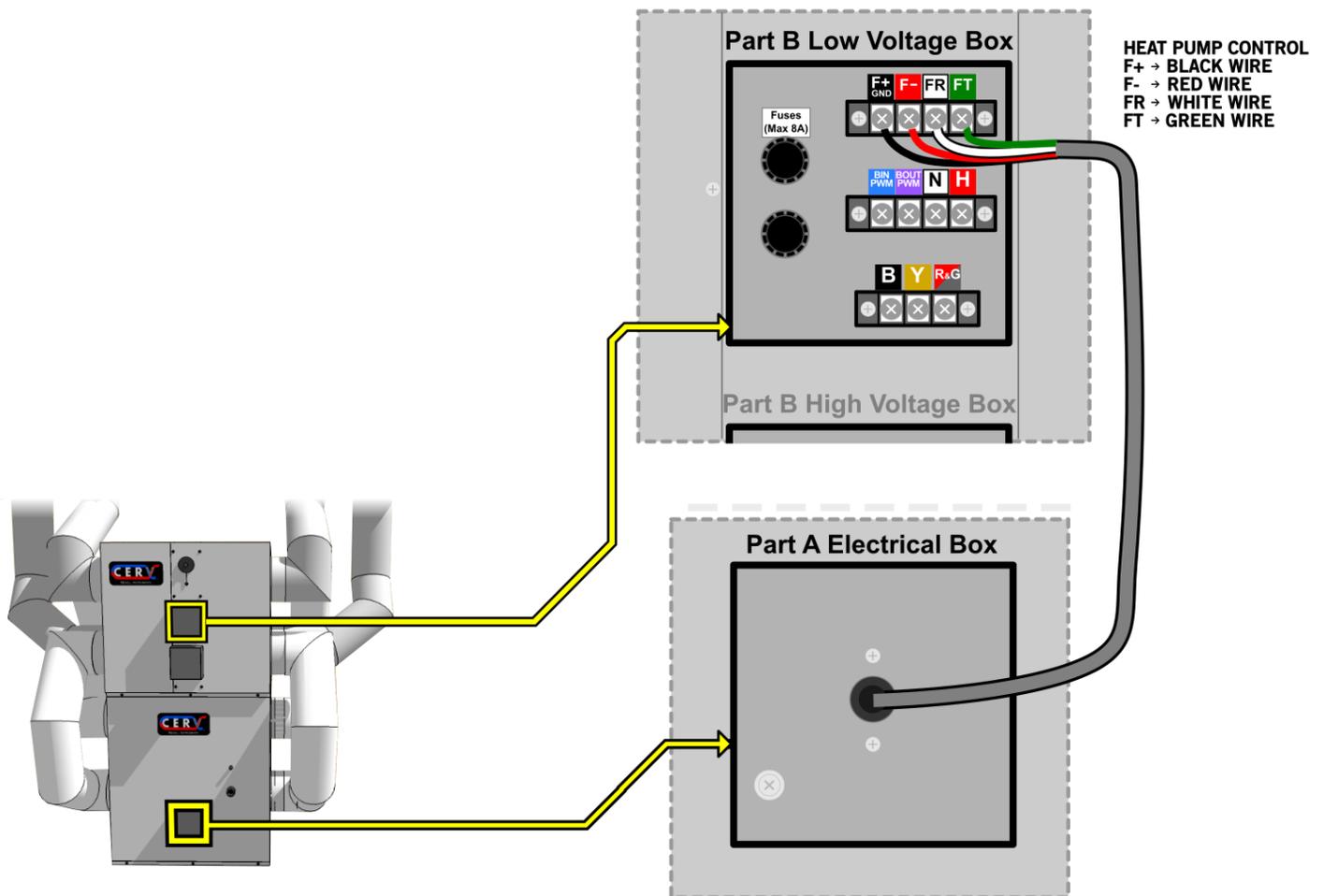
3. Run electrical supply (120vAC) to the CERV-001-PARTA module. The power input from your supply panel connects to the 16 gauge White and Black wires in the junction box on the module. Ground the power input with the included green ground screw.
4. Run electrical supply (120vAC) to the CERV-001-PARTB module. The power input from your supply panel connects to the 16 gauge White and Black wires labeled 120vN and 120vH in the high voltage junction box on the module. Ground the power input with the included green ground screw.
5. Part A and Part B can be powered from the same 120vAC source.
6. It is recommended to place a switch in the same area as the CERV to shut power off to the unit when needed.



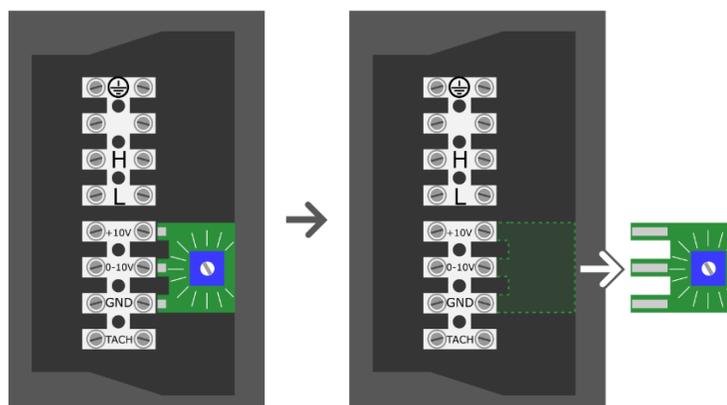
7. The CERV's external in-line fans are powered directly from the CERV. Run wire to the blowers from the CERV-001-PARTB high voltage junction box. Each blower is powered individually, so ensure that the correct blower is wired to its corresponding wires labeled hot (red) and neutral (white) in the HV junction box. The supply blower wires will be labeled BinN and BinH, while the exhaust blower wires will be labeled BoutN and BoutH. Blowers may share the same ground (green).



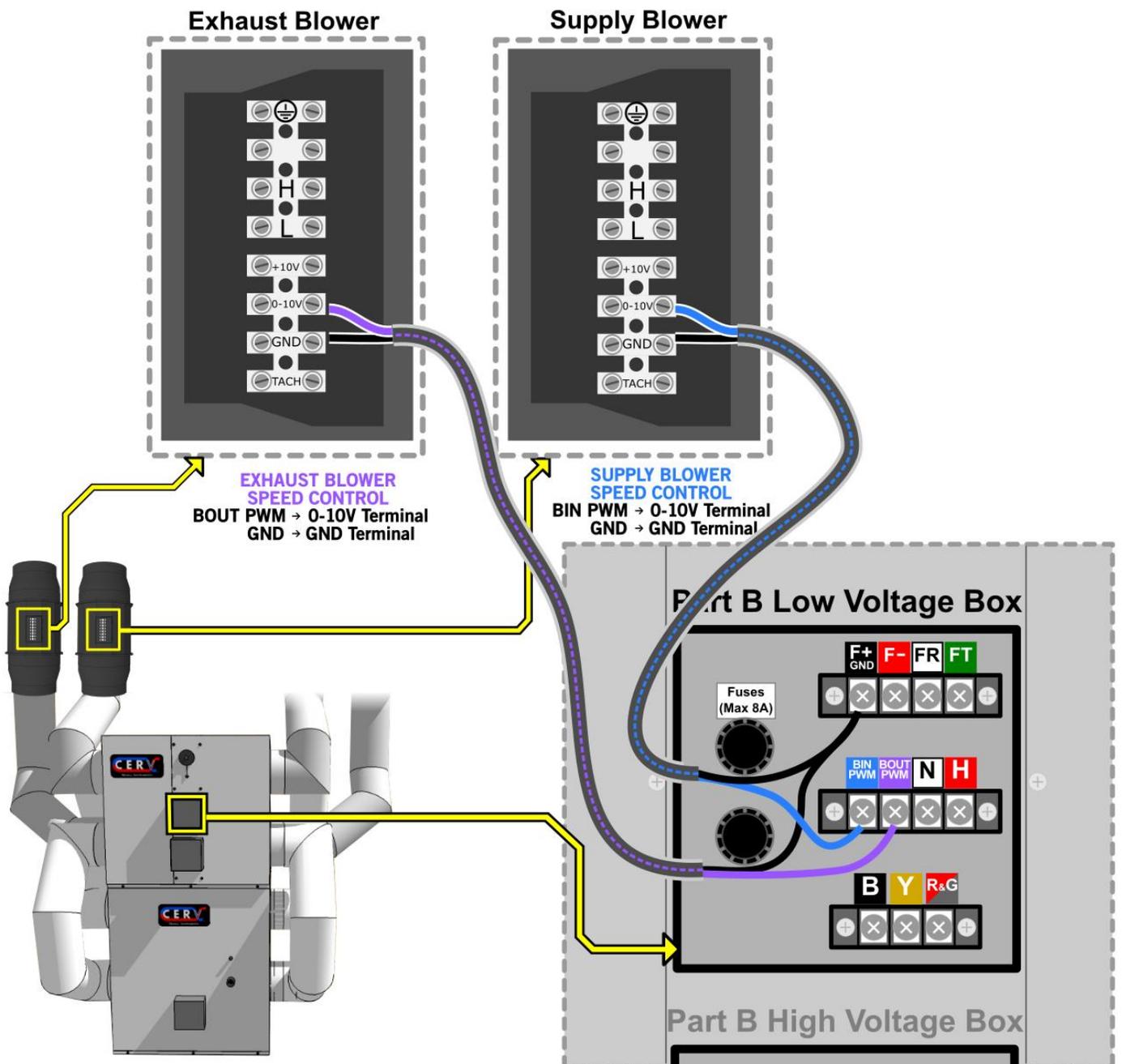
- Run the included 4 wire low voltage cable from PARTA to PARTB. Connect the Black wire to terminal F+, Red to F-, White to FR, and Green to FT. Low voltage wiring does not need to be inside conduit, just ensure that it is secure. See figure below.



- Remove and discard the small green circuit board from the +10V, 0-10V, and GND terminals from each of the CERV's two in-line ECM fans.

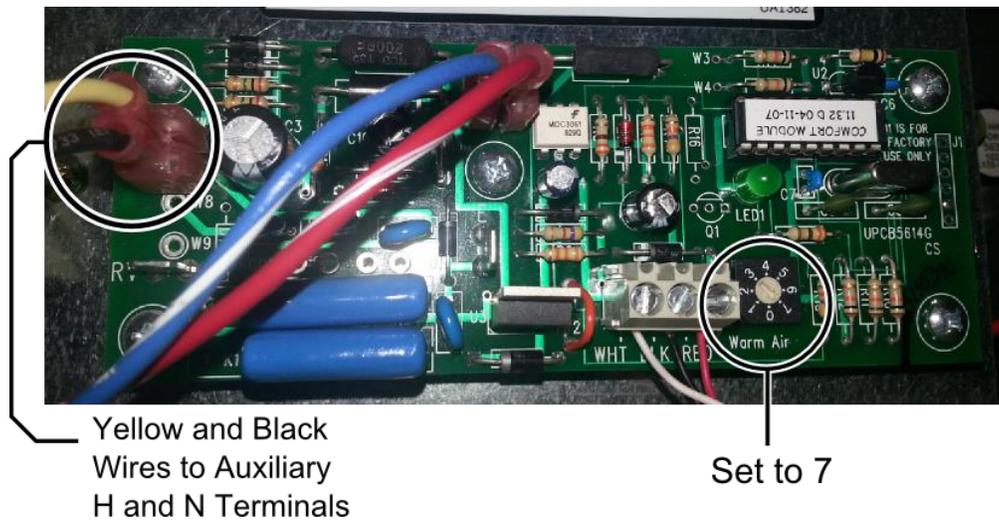


10. Run two conductor low voltage cable (not included, minimum 24ga) from PARTB Low Voltage Box to the supply and exhaust fans. These cables are used to control the speed of each fan. Connect the BIN PWM terminal from PARTB to the 0-10V terminal on the supply blower. Connect the BOUT PWM terminal from PARTB to the 0-10V terminal on the exhaust blower. Connect the F_{GND}^{+} terminal from PARTB to the GND terminals of both supply and exhaust blowers. See figure below.



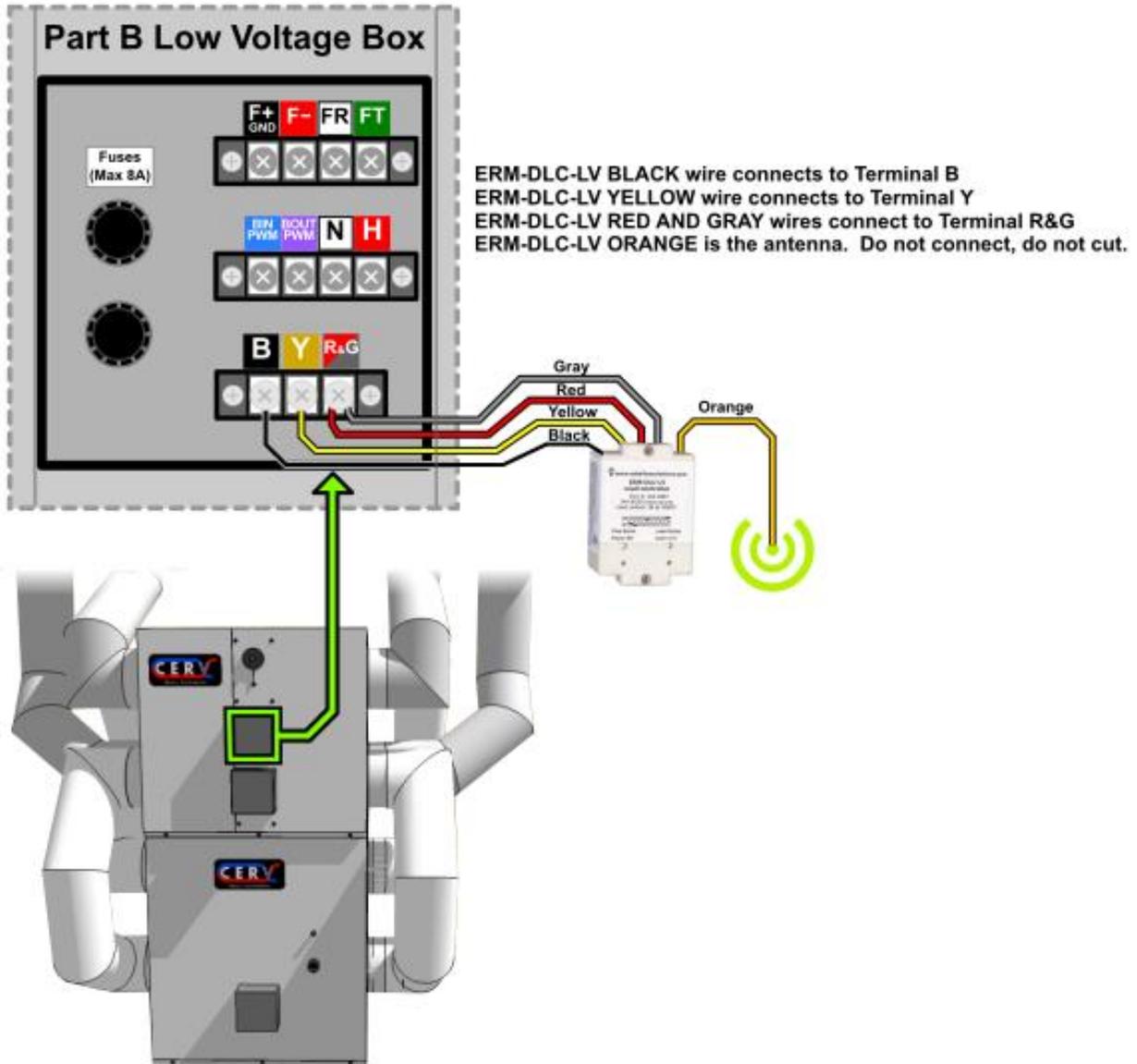
11. Auxiliary Heater Option (If not used, skip to next step)

- a. Run control wiring from the LV junction box of PART B to the aux heater (the yellow and black wires included with the heater). This wire will only carry a low current 24vAC control signal; Thermostat wire may be acceptable if the included wire is not long enough.
- b. Set the Warm Air dial, pictured below, to a value of 7 and install the included temperature sensor in the duct **after** the auxiliary heater.
- c. Follow electrical wiring procedures for installation of supply line power to auxiliary heater.



12. Wireless Ventilation Switch Option (If not used, skip to next step)

- a. Follow the wiring diagram below and match the colors of the wires to the terminal block labels.
- b. Wires may be run through the same stress relief as the PARTA wiring, and the wireless relay can be secured with a strip of Velcro (not included).
- c. A short length of adhesive backed Hook and Loop fastener is included with the wireless switch relay. This may be used to mount the relay near the junction box. Ensure that you still have access to the Clear and Learn buttons on the relay.



STARTING AND COMMISSIONING THE SYSTEM

Please review all ducting, insulating, condensate drain, and electrical sections before continuing. After all electrical wiring has been completed and all connections have been double checked, apply power to the unit. If the blowers turn on, everything is working properly, if not, go back and check all wiring again. When the unit is first started, it will turn on the inside blower for approximately 10 seconds before starting up the rest of the system. Use this to ensure that the blowers are correctly wired (i.e. BIN wires go to the supply blower, BOUT wires go to the exhaust blower).

For the first 3 minutes after startup, the CERV will go into an Assess mode. In this mode, it recirculates air throughout the home and compares to the configured heating, cooling, and ventilation setpoints. For commissioning the unit, it is important to check the following features of the unit:

WIRELESS TOUCH SCREEN CONTROLLER

Locate the touch screen controller and its power supply. For commissioning purposes, the touchscreen controller should be brought into the same room as the CERV.

1. Plug the power supply into the touchscreen controller and then plug the power supply into an outlet.
2. The CERV logo will initially show on the screen, and then after 5 seconds, you will enter the home screen. This screen displays the inside and outside temperature and relative humidity, as well as the CO2 and VOC indoor air quality levels.
3. In the top right corner of the home screen, there is a small wireless connectivity icon. Within about 10 seconds, the icon should be green . If the icon stays gray with a red X , there may be a communication problem. Check power to the CERV and compare the serial number on back of the touchscreen with the serial number on CERV Part B to ensure they match. If this is unable to be resolved, please contact Build Equinox at (773) 492-1893.
4. Once the wireless connectivity icon turns green, the touchscreen controller and the CERV have successfully communicated. You may proceed to the next section.

HEAT PUMP OPERATION

In this section, we will ensure that the heat pump has been wired correctly and is operating.

1. With the CERV and Wireless Touchscreen powered and communicating, enter the Temperature Setpoint screen by pressing the icon at the bottom of the right of the home screen: 
2. The goal is to force the heat pump to enable, so adjust the setpoints so that the CERV is either heating, or cooling. That is, if it is 70 degrees inside and you want to force it to cool, you could select a cooling setpoint of 65 and a heating setpoint of 60. Or to force it to heat, you could set the cooling setpoint to 80 and heating setpoint to 75.
3. If the CERV was previously off (because no conditioning was needed), it will perform another 3 minute assessment period and then begin to heat or cool. If the CERV was active, it should immediately start heating or cooling. Press the check box in the setpoints screen to accept the changes.

4. The touchscreen should shortly update and show the new mode. Compressor operation can be verified by the following:
 - a. If the room is quiet enough, you may be able to hear the compressor start
 - b. With a clamp-on ammeter, you can test the current flowing through the 120v power wires to the compressor. Normal compressor operation can be anywhere around 2 - 4 amps, depending on the conditions.
 - c. You may be able to feel the supply air getting warm or cold, depending on the mode.
 - d. After around 5 minutes of operation, if the compressor still has not come on, the touchscreen controller will display an alert  in the top right corner of the home screen. When you tap the icon, it will take you to the alerts screen, which will display more information.

ECM FAN SPEED CONFIGURATION

The fan speed has been factory set to 80%. If airflow measurements are being taken for commissioning purposes the fan speed can be increased or decreased by following the steps in the Touchscreen User's Manual.

APPENDIX - ELECTRICAL

DANGER: RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH: DISCONNECT ALL REMOTE ELECTRIC POWER SUPPLIES BEFORE SERVICING.

ELECTRICAL CONNECTIONS QUICK REFERENCE GUIDE

CERV-001-PARTA - Conduit Box – High Voltage Connections:

- 120 H (Black):** Connect to **120V POWER SUPPLY BLACK** wire.
- 120 N (White):** Connect to **120V POWER SUPPLY WHITE** wire.
- Ground Screw:** Connect to **120V POWER SUPPLY GROUND** wire (green).

CERV-001-PARTA - Conduit Box – Low Voltage Cable

- BLACK Wire:** Connect to **F+ SCREW TERMINAL** of CERV-001-PARTB LOW VOLTAGE CONDUIT BOX.
- RED Wire:** Connect to **F- SCREW TERMINAL** of CERV-001-PARTB LOW VOLTAGE CONDUIT BOX.
- WHITE Wire:** Connect to **FR SCREW TERMINAL** of CERV-001-PARTB LOW VOLTAGE CONDUIT BOX
- GREEN Wire:** Connect to **FT SCREW TERMINAL** of CERV-001-PARTB LOW VOLTAGE CONDUIT BOX

CERV-001-PARTB - High Voltage Conduit Box:

- 120 H (Black):** Connect to 120V POWER SUPPLY HOT wire (black).
- 120 N (White):** Connect to 120V POWER SUPPLY NEUTRAL wire (white).
- Bin H (Red):** Connect to SUPPLY BLOWER HOT wire (black).
- Bin N (white):** Connect to SUPPLY BLOWER NEUTRAL wire (white).
- Bout H (Red):** Connect to EXHAUST BLOWER HOT wire (black).
- Bout N (white):** Connect to EXHAUST BLOWER NEUTRAL wire (white).
- Ground Screw (green):** Connect ground wires from 120V POWER SUPPLY, SUPPLY BLOWER, and EXHAUST BLOWER with green ground screw.

CERV-001-PARTB - Low Voltage Conduit Box:

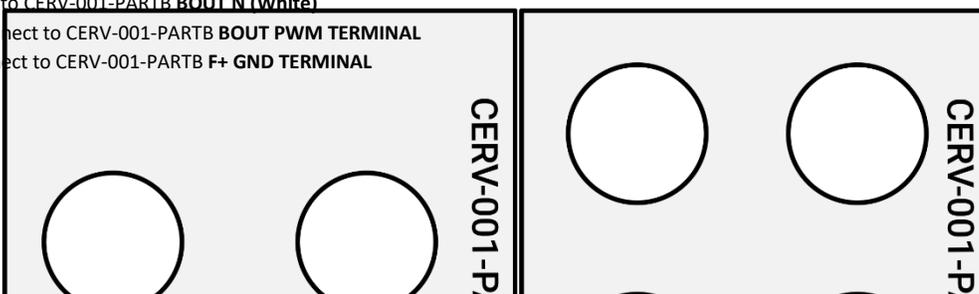
- F+:** Connect to CERV-001-PARTA LOW VOLTAGE cable **BLACK WIRE**, **SUPPLY BLOWER GND TERMINAL**, **EXHAUST BLOWER GND TERMINAL**
- F-:** Connect to CERV-001-PARTA LOW VOLTAGE cable **RED WIRE**.
- FR:** Connect to CERV-001-PARTA LOW VOLTAGE cable **WHITE WIRE**.
- FT:** Connect to CERV-001-PARTA LOW VOLTAGE cable **GREEN WIRE**.
- BIN PWM:** Connect to **SUPPLY BLOWER 0-10V TERMINAL**
- BOUT PWM:** Connect to **EXHAUST BLOWER 0-10V TERMINAL**
- B:** (Wireless Switch Option) **Black** wire from wireless relay DLC.
- Y:** (Wireless Switch Option) **Yellow** wire from wireless relay DLC.
- R&G:** (Wireless Switch Option) **Red and Gray (or white)** wires from wireless relay DLC.
- N:** (Auxiliary Device Option) Connect 24v control wire to auxiliary device (24V Neutral).
- H:** (Auxiliary Device Option) Connect 24v control wire to auxiliary device (24V Hot).

Supply Blower Conduit Box:

- (EARTH GROUND):** Connect to CERV-001-PARTB **GROUND SCREW**
-  Connect to CERV-001-PARTB **BIN H (Red)**
- L:** Connect to CERV-001-PARTB **BIN N (White)**
- 0-10V:** Connect to CERV-001-PARTB **BIN PWM TERMINAL**
- GND:** Connect to CERV-001-PARTB **F+ GND TERMINAL**

Exhaust Blower Conduit Box:

- (EARTH GROUND):** Connect to CERV-001-PARTB **GROUND SCREW**
-  Connect to CERV-001-PARTB **BOUT H (Red)**
- L:** Connect to CERV-001-PARTB **BOUT N (White)**
- 0-10V:** Connect to CERV-001-PARTB **BOUT PWM TERMINAL**
- GND:** Connect to CERV-001-PARTB **F+ GND TERMINAL**





www.buildequinox.com

1103 N. High Cross Rd.
Urbana, IL 61802

support@buildequinox.com
(773)-492-1893