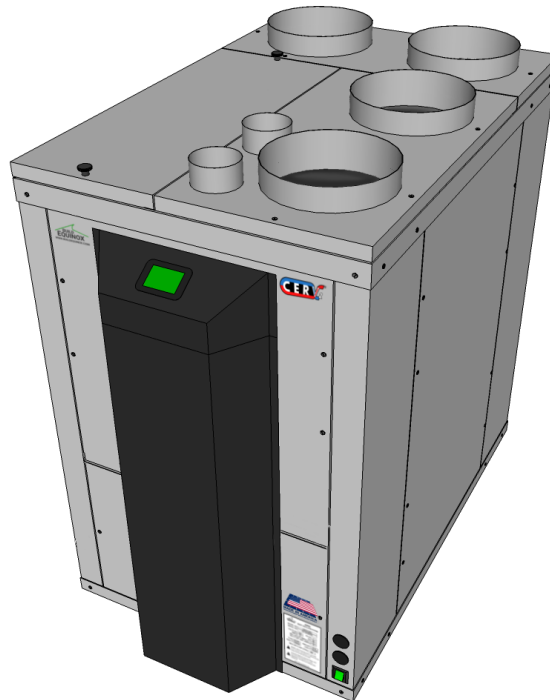




INSTALLATION MANUAL

Models CERV2-6EC, CERV2-8EC



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Contents

Specifications 3

General Considerations 6

Installation Procedure 7

 Unit Installation & Ducting 7

 Insulating 7

 Water Drain 11

Electrical 14

 General Wiring Guidelines 14

 Electrical Installation 14

Filters 15

Starting and Commissioning the System 16

 Touch Screen Interface 16

 ECM Fan Speed Configuration 16

Appendix – WiFi Setup..... 17

Appendix – Fan Speed Configuration 19

Appendix - Electrical 20

Specifications

Electrical

Voltage Supply	120V (60hz)
Min Circuit Size	12 A
Connection	NEMA 15-5P Plug, 6ft cord

System

Unit Dimensions	25.5" W x 40" L x 38" H
Unit Weight	139 lbs (6EC), 142lbs (8EC)
Airflow Rate	100-300 CFM
Air Filter Size	10" x 20" x (1" or 2")
Duct Size	8" Main 3" Utility
Condensate Drain	3/4" PVC Male

Sensors

Temperature	-40 to 185F +/- 0.36F
Relative Humidity	0 to 100% +/- 2%
CO ₂	0 to 5000ppm +/- 25ppm +/- 3%
VOC	450 to 2000ppm CO ₂ Equivalent

VOCs Detected

Alcohols, Aldehydes, Aliphatic Hydrocarbons, Amines, Aromatic
Hydrocarbons, CO, CH₄, LPG, Ketones, Organic Acids

Sensors are self-calibrating and do not require maintenance

Warranty

Parts and Labor	1 st Year
Parts	5 Years

Performance

Heating: 47F Outside, 68F Inside

Heating Capacity (Btu/h)	4731 (recirc)* 6531 (vent)**
Heating Efficiency (COP) (excludes fan power - see below)	3.6 (recirc) 4.8 (vent)
Heating Elec Power (W) (excludes fan power - see below)	379 (recirc) 399 (vent)

Heating: 32F Outside, 68F Inside

Heating Capacity (Btu/h)	3702 (recirc) 6789 (vent)
Heating Efficiency (COP) (excludes fan power - see below)	3.3 (recirc) 5.4 (vent)
Heating Elec Power (W) (excludes fan power - see below)	331 (recirc) 366 (vent)

Heating: 17F Outside, 68F Inside

Heating Capacity (Btu/h)	2674 (recirc) 7046 (vent)
Heating Efficiency (COP) (excludes fan power - see below)	2.8 (recirc) 6.2 (vent)
Heating Elec Power (W) (excludes fan power - see below)	283 (recirc) 332 (vent)

Cooling: 95F(DB)/75F(WB) Outside, 80F(DB)/67F(WB) Inside

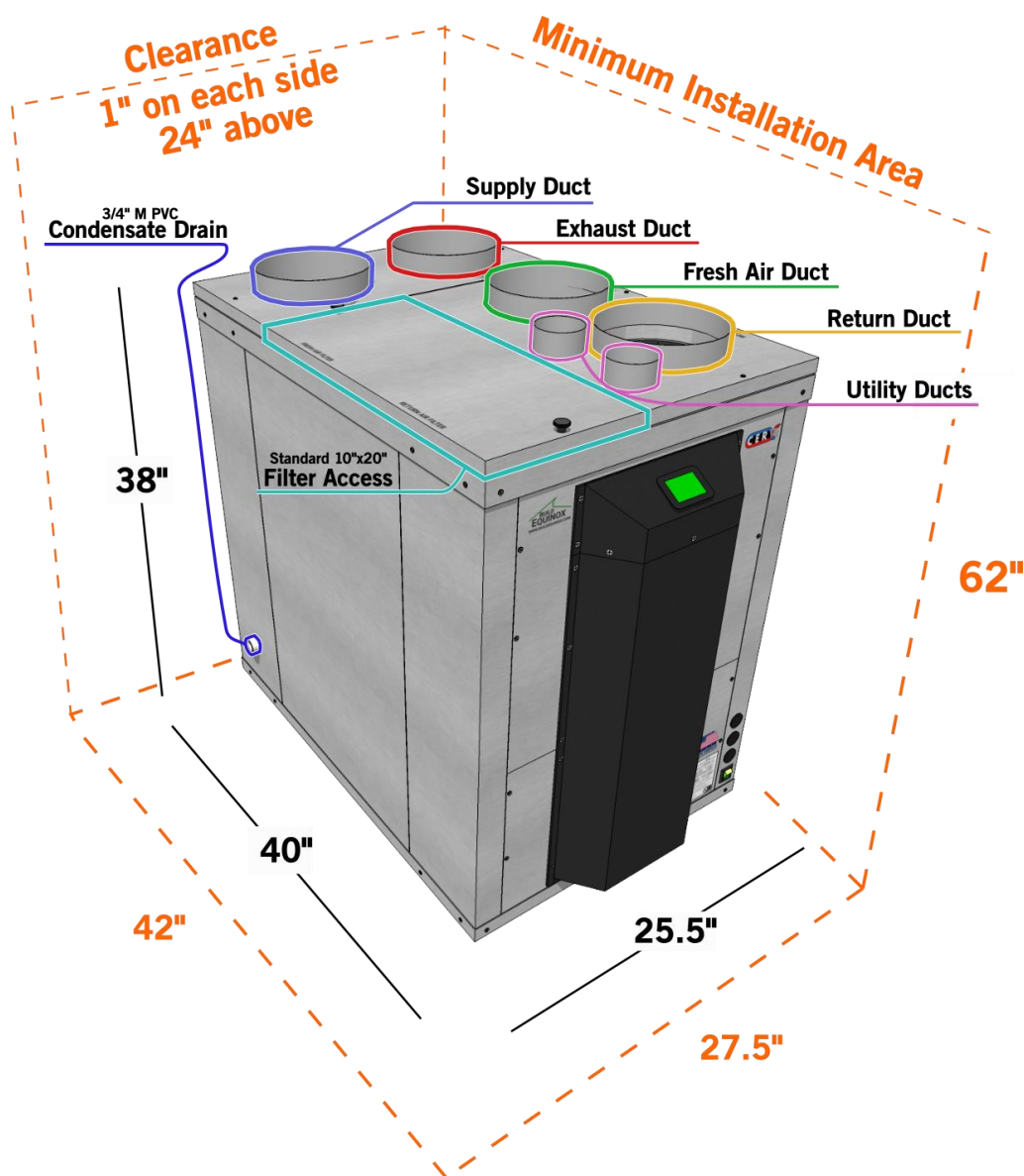
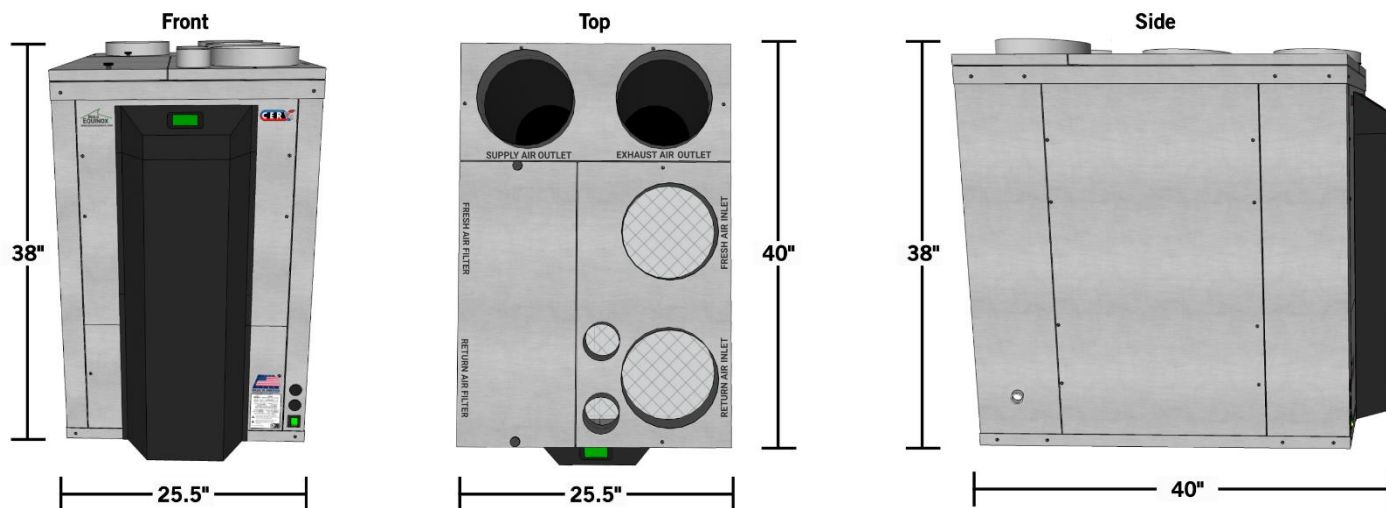
Cooling capacity (Btu/h)	2230 (recirc) 5314 (vent)
Sensible cooling (Btu/h)	1318 (recirc) 3891 (vent)
Latent cooling (Btu/h)	912 (recirc) 1423 (vent)
Dehumidification (Liters/day)	9.6 (recirc) 14.9 (vent)
Cooling Efficiency (COP) (excludes fan power - see below)	3.2 (recirc) 7.6 (vent)
Cooling Elec Power (W) (excludes fan power - see below)	202 (recirc) 204 (vent)

Fans

Total fan power (W)	38.6(50% speed)
ECM Fans (heating & cooling)	98.1(70% speed)

* Recirculation mode heating and cooling capacity is relative to indoor conditions

** Ventilation mode heating and cooling capacity is relative to outdoor air conditions



General Considerations



DANGER: Risk of electric shock. Can cause injury or death: disconnect all remote electric power supplies before servicing.

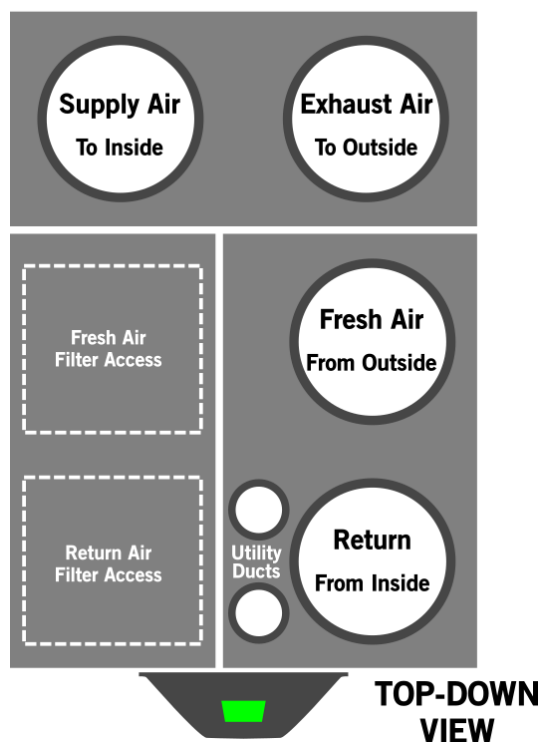
1. Please review entire manual before proceeding with installation. Improper installation or deviation from instructions can result in damage and warranty being voided.
2. Ensure that all components are on hand and free from defects or damage.
3. Installation and service should be performed by qualified 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 CERV2 by duct fittings or front electrical enclosure.
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 CERV2 unit. If not, a condensate pump must be used.

Installation Procedure

Unit Installation & Ducting

1. Review Ducting section below to determine most applicable ducting scheme.
2. It is recommended to install the CERV2 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 the CERV2. A moisture sensor and alarm can also be used to notify occupants of a problem.
3. Fix the CERV into position and ensure stability. **Unit 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.

CERV2 Duct Connections



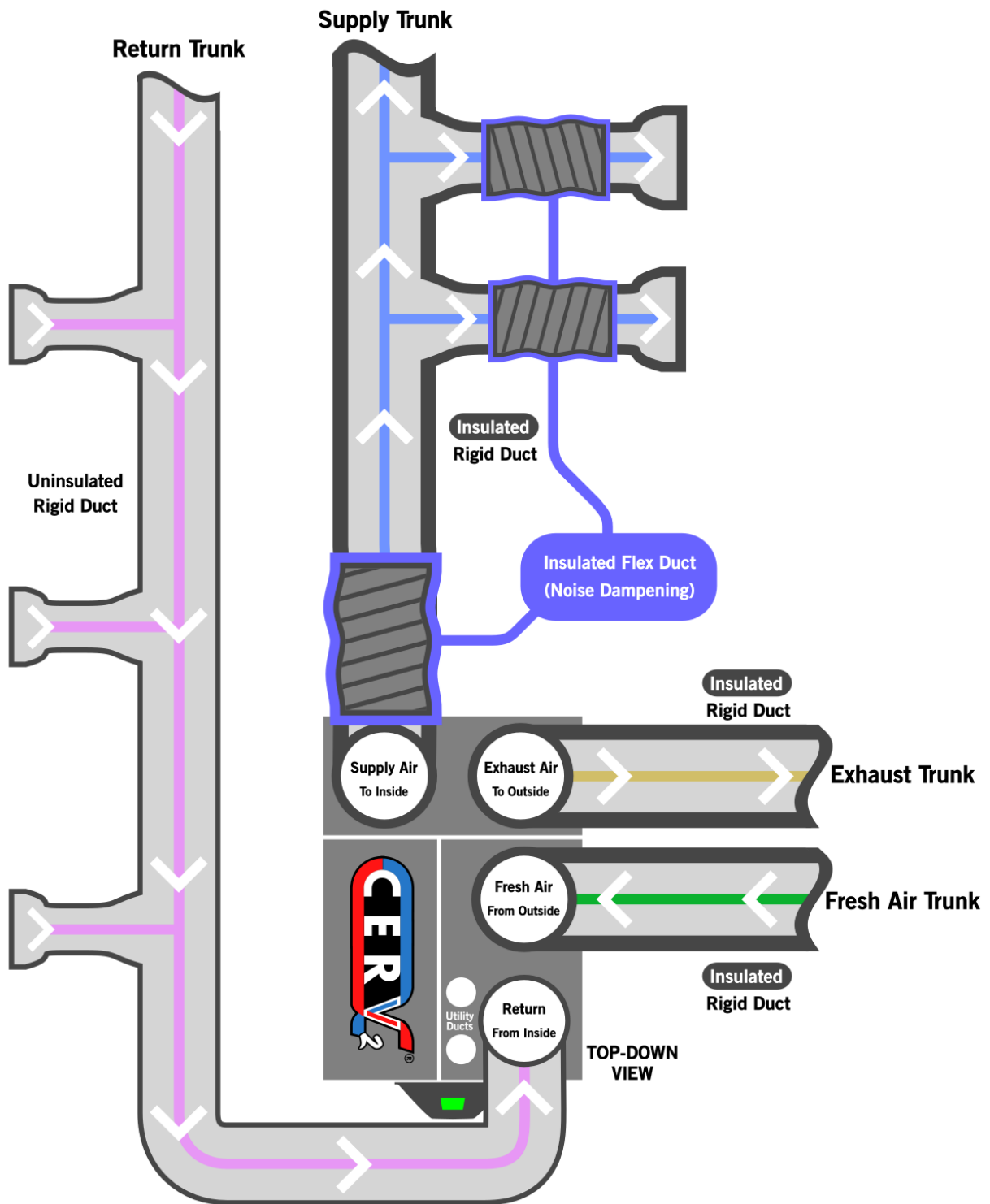
Insulating

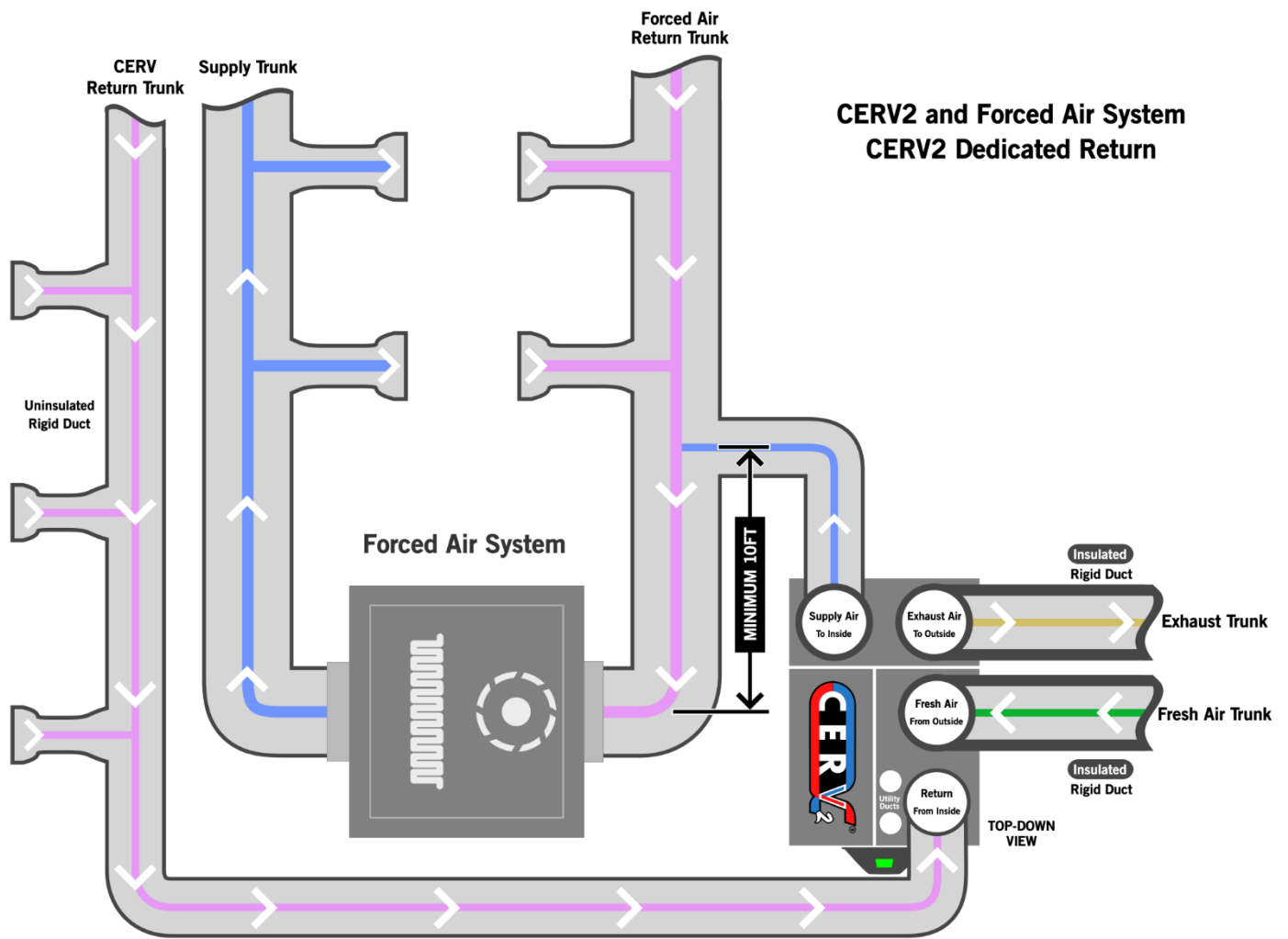
In the winter, the unit will be bringing in cold air, passing it through the heat pump, and then exhausting EVEN COLDER air. In the summer, the CERV will be bringing in hot air, passing through the heat pump, and exhausting EVEN HOTTER air. It is therefore extremely important that the components of the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

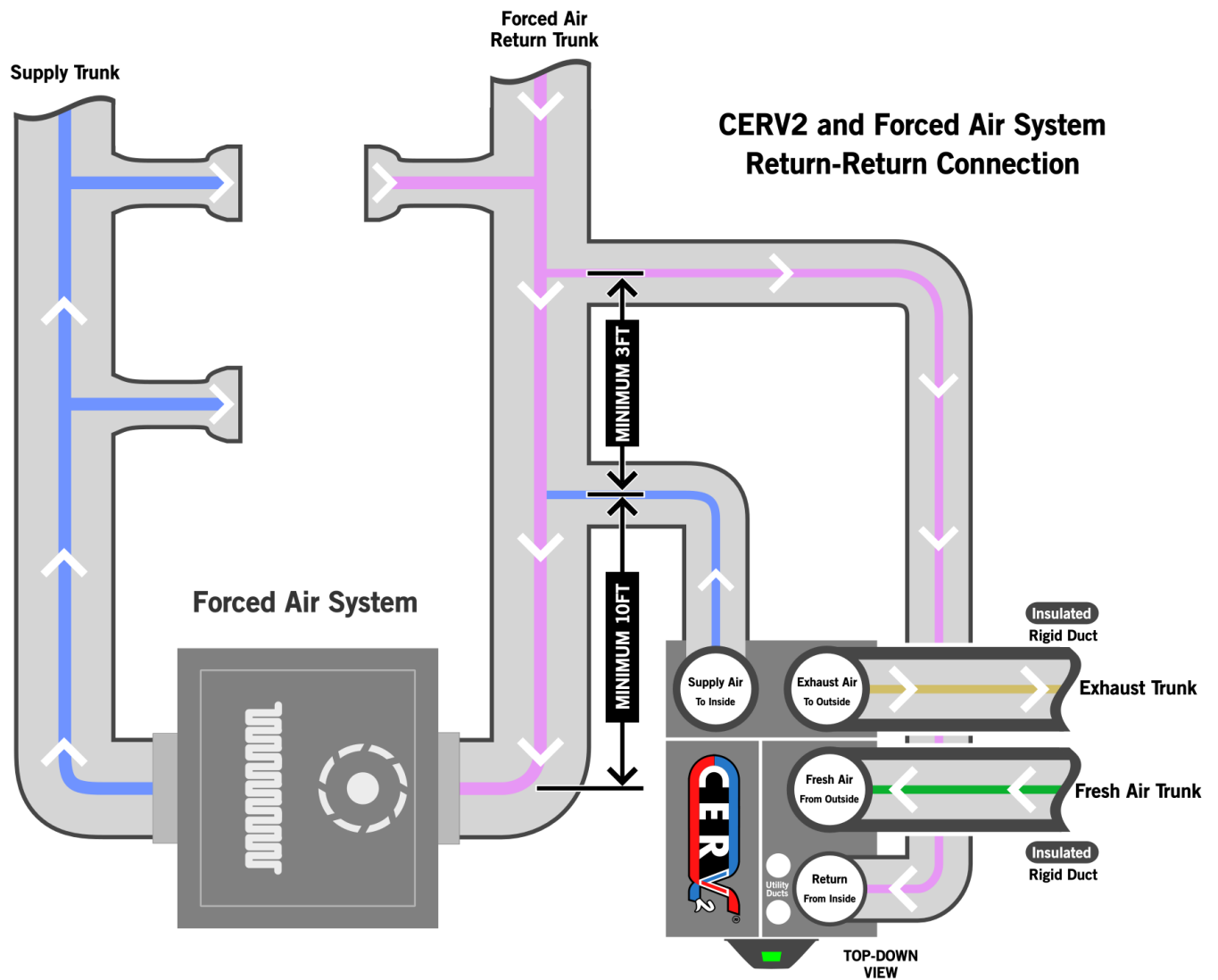
Ducts

All ducts except for the RETURN (from inside) must be insulated. It is recommended to use a minimum of R4.0 insulation for supply to the inside and R8.0 on the ducts to and from the outside. In colder climates, it may be necessary to add additional insulation if it appears that the ducts may be showing signs of sweating.

CERV2 with Dedicated Supply and Return

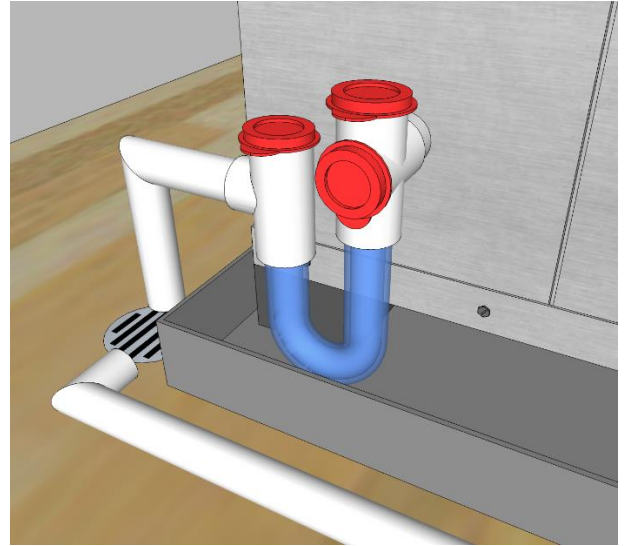






Water Drain

1. The CERV should be spaced raised up approximately 2 inches from the ground to allow space for the included EZ-Trap
2. The outlet of the EZ-trap should direct either to a floor drain, or condensate pump



Overflow Pan

For installations where water damage could be a possibility (i.e. finished spaces, attic, etc), an overflow pan should be placed under the CERV.



Recommended Drain Pan: DiversiTech 6-2739L

Pan Dimensions: 29" x 41" x 2"

Wet Switch

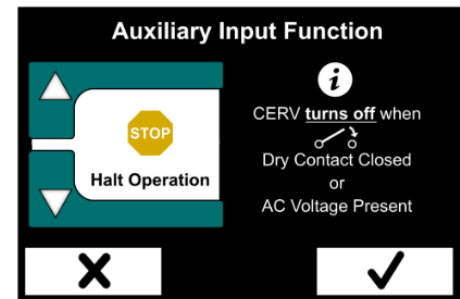
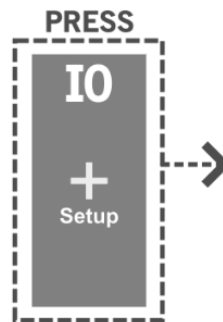
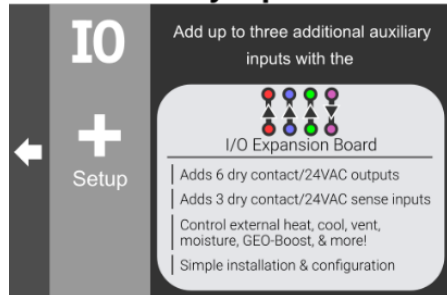
For added protection, a wet switch may be installed in the drain pan or base of the CERV. Two options exist for wet switch configuration.

Auxiliary Input – Halt Operation

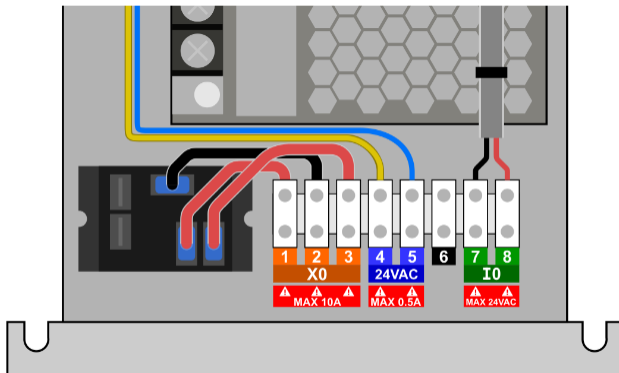
A Normally Closed moisture detection switch may be used along with a 24VAC coil SPDT relay (recommended part: Omron G2R-1-T-AC24) to trigger the Halt Operation functionality of the CERV's Auxiliary Input(s). See appendix for Auxiliary Input location and access.

Touchscreen Configuration

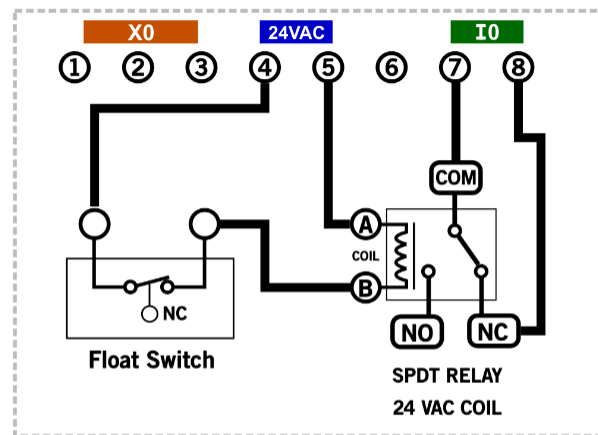
Wired Auxiliary Input Overview



Wet Switch Circuit



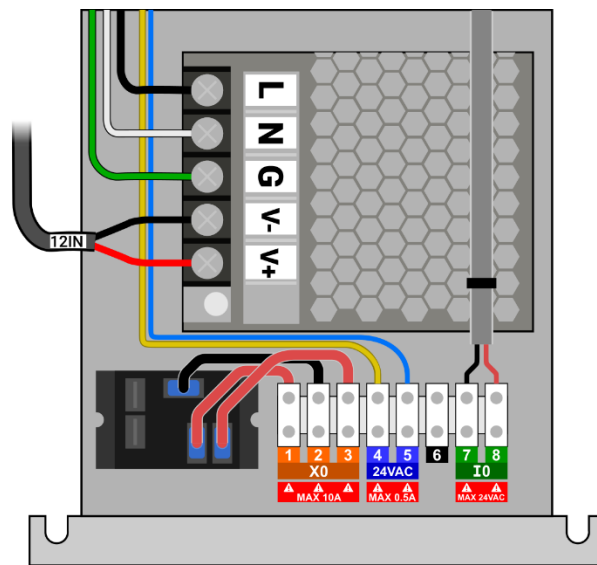
Basic Circuit



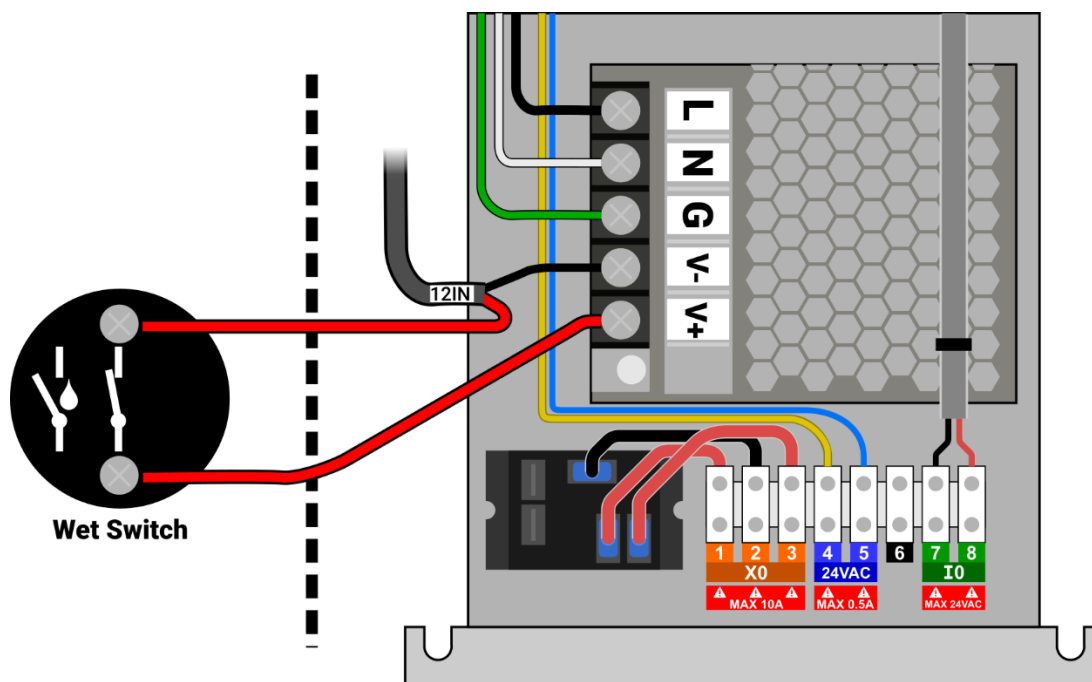
- 1) When safety switch is OK (no water), relay coil is energized, COM connects to NO, open circuit on **I/O**
- 1) When safety switch faults, relay coil is de-energized, COM connects to NC, closed circuit on **I/O**, system shuts down.

Direct Power Cutoff

The wet switch may be used to directly disconnect power from the main controls of the CERV, ensuring that the system shuts off if flooding occurs.



Factory Wiring



Wet Switch Installation

Disconnects power from main control board when moisture detected.

Electrical



DANGER: risk of electric shock. Can cause injury or death: disconnect all remote electric power supplies before servicing.

Electrical Ratings

Voltage Supply	120VAC (60hz)
Minimum Circuit Size	12A
Connection	Standard NEMA 5-15P Plug, 6ft Cord

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.
- Supplied power to the unit must comply with the nameplate requirements.
- The CERV should have its own dedicated circuit.
- Never run control wiring and power wiring through the same conduit.
- Always use proper gauge stranded copper wire for power connections.

Electrical Installation

1. With the CERV unplugged, install any auxiliary field wiring to the unit. The CERV includes three standard $\frac{3}{4}$ " electrical knockouts, directly above the power switch. These should be used, along with strain relief fittings, for any auxiliary input or output connections. See Appendix at the end of the document for auxiliary wiring guidelines and specific examples.
2. Ensure that the front power switch on the CERV is OFF. The green rocker power switch should be in the DOWN position.
3. The CERV plugs into a standard North American 3 prong outlet and is supplied with 6 feet of power cord. Plug the CERV into its dedicated power outlet.

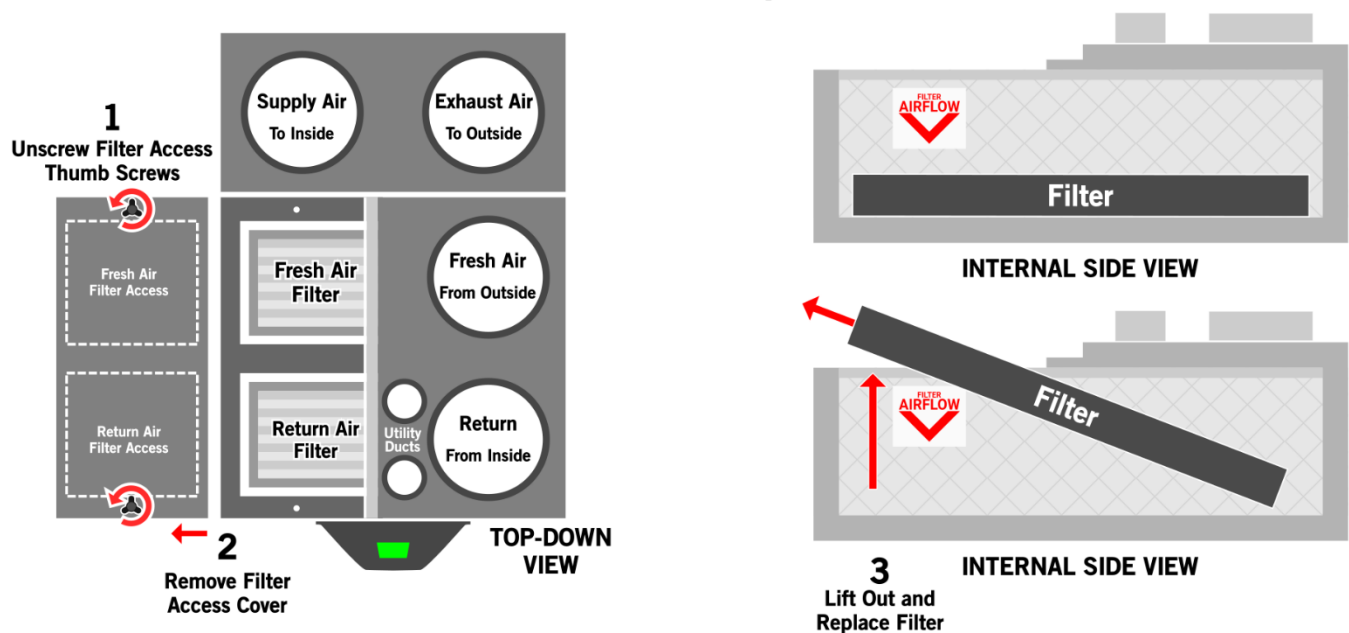
Filters

The CERV2 contains filters for both incoming fresh air from outside and return air from inside. The filters can be easily accessed by unscrewing the top two thumb-screws and removing the top filter access cover. **Before opening the filter access cover, it is important to stop fan operation during this time.** This can be done by either powering off the CERV2 by switching off the green main power switch or the CERV2 can be set to “off” mode by navigating to the Main Menu, System, and Operation Mode. When replacing the filters, care should be made not to drop any object into the openings.

The CERV2 comes standard with two MERV 13, 10”x20”x1” filters. Any 10”x20” filter 1” or 2” thick can be used, although using filters higher than MERV 13 can cause higher fan power for little gain in filtration. Ensure that the filter direction corresponds to the airflow direction sticker on the inside of the CERV (points down). Filters should be replaced at least every 90 days, but indoor and outdoor particulate levels may necessitate more frequent changing. The inside and outside filters may also have different changing schedules. The return air filter may need less frequent changing than the fresh air filter. Logging filter changes in the Notes section of this manual can help track the maintenance schedule. Regular filter maintenance is important in keeping the inside air healthy and free from particulates as well as allowing for peak system operating efficiency. Once the filters have been replaced and the access cover secured, the system can be switched back on or set back to “auto” mode to continue normal operation.

OEM CERV filter can be purchased at www.buildequinox.com/store/

Filter Access and Replacement



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. When the unit is first started, it takes approximately 30 seconds to initialize valves and check system health.

For the first 3 minutes after initialization, 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:

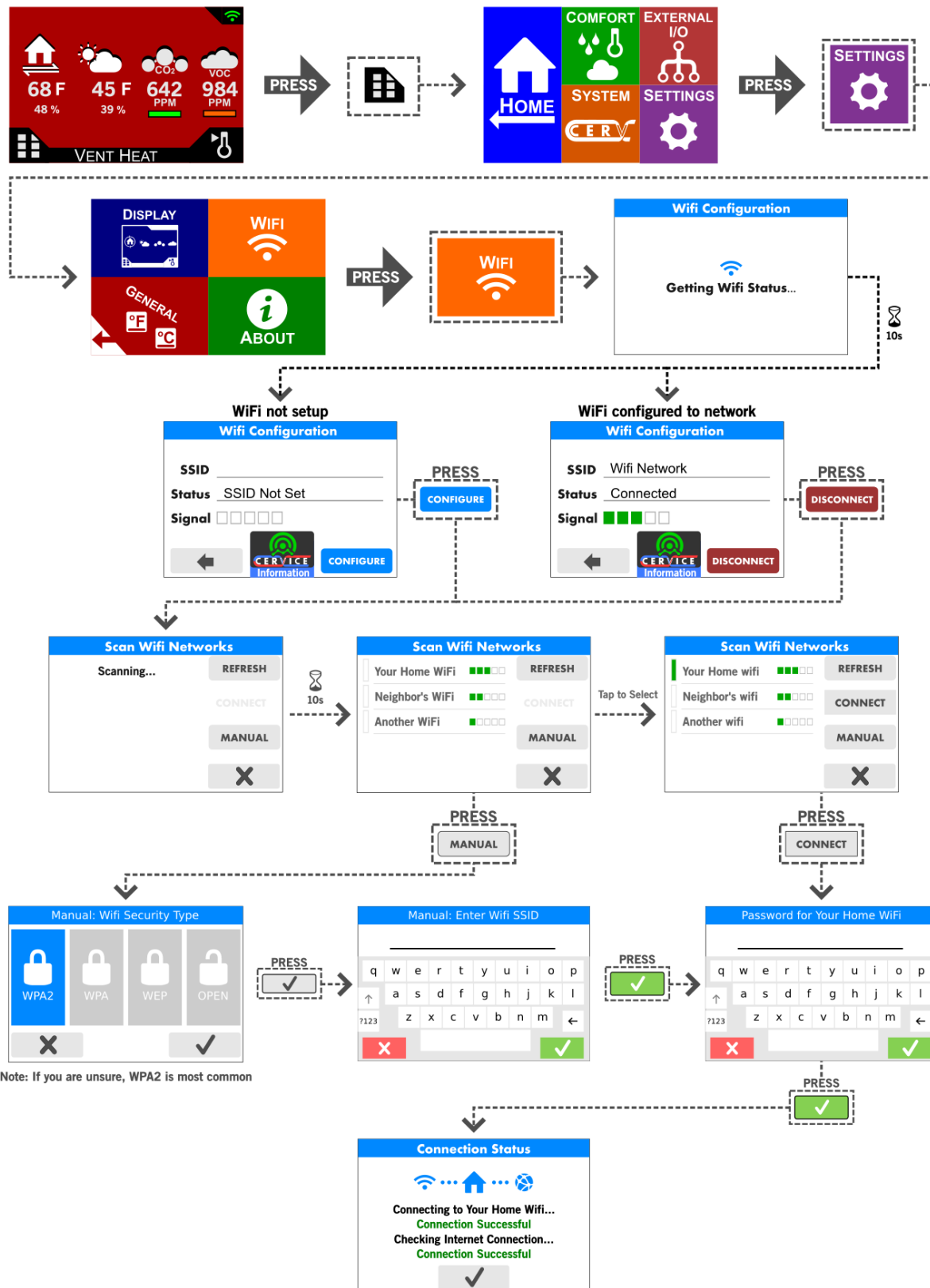
Touch Screen Interface

1. The CERV logo will initially show on the screen, and then after approximately 15 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.
2. In the top right corner of the home screen, there is a small WiFi connectivity icon. For information regarding setting up the connection to your home router, please see the Appendix.
3. Once the wireless connectivity icon turns green, the CERV has successfully connected to the online server and is ready to control through your computer or mobile device anywhere in the world!

ECM Fan Speed Configuration

The fan speed has been factory set to 50%. If airflow measurements are being taken for commissioning purposes the fan speed can be increased or decreased by following the steps in the Appendix.

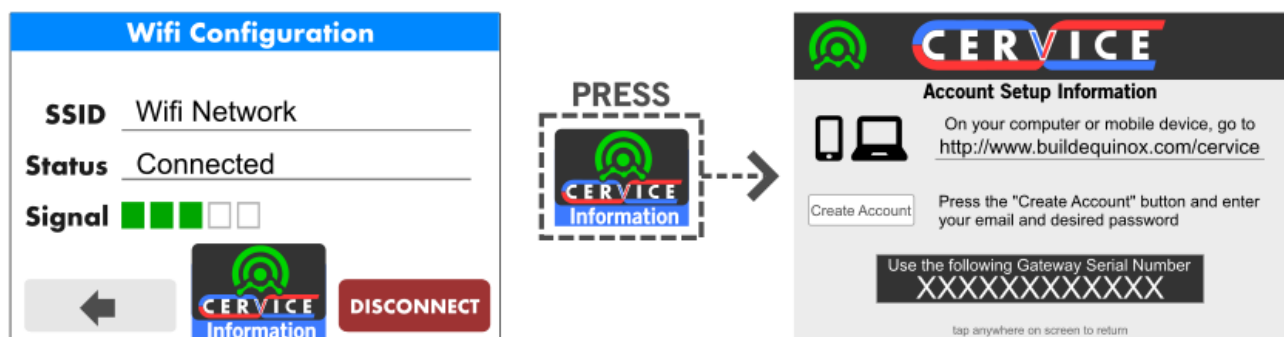
Appendix – WiFi Setup



Connection Status Troubleshooting



Wifi Connection Error	Probable Cause & Resolution
Couldn't Find SSID	<ul style="list-style-type: none"> If Manual setup was used to connect to the WiFi Network, check for misspellings in the network name and try again. On another device (phone/laptop/etc), check that the network exists and is exactly as entered on the CERV. The CERV currently only operates on 2.4GHz WiFi networks. 5GHz wifi is not supported at this time.
Incorrect Password	<ul style="list-style-type: none"> If Manual setup was used to connect to the WiFi Network, check to ensure the network security is correctly set. Most modern WiFi networks use WPA2. This can often be verified with on a computer or phone by examining network properties. Ensure that the entered password is correct.
Timed out - try again	<ul style="list-style-type: none"> There may be an issue with the internal WiFi configuration, and the connection attempt timed out. Press the checkbox button on the bottom of the screen, which will take you back to the "Getting WiFi Status" screen. Stay on this screen for a minute to see if it was able to recover and make the connection. If not, try adding the network again as before. If re-adding the network gives the same timed out error, try powering off the CERV, then back on, and adding the network again. Resetting power to the internal WiFi could potentially resolve the issue.
No Connection to Internet Or No Connection to Server	<ul style="list-style-type: none"> Connection to the WiFi network was successful, but the CERV is having trouble uploading data through the internet. This often resolves itself after several minutes (depending on the network). Contact Build Equinox if this does not resolve itself.

CERVICE Online Control & Monitoring Account Setup



CERVICE Mobile App

On your mobile phone or tablet, open your web browser and navigate to www.buildequinox.com/cervice

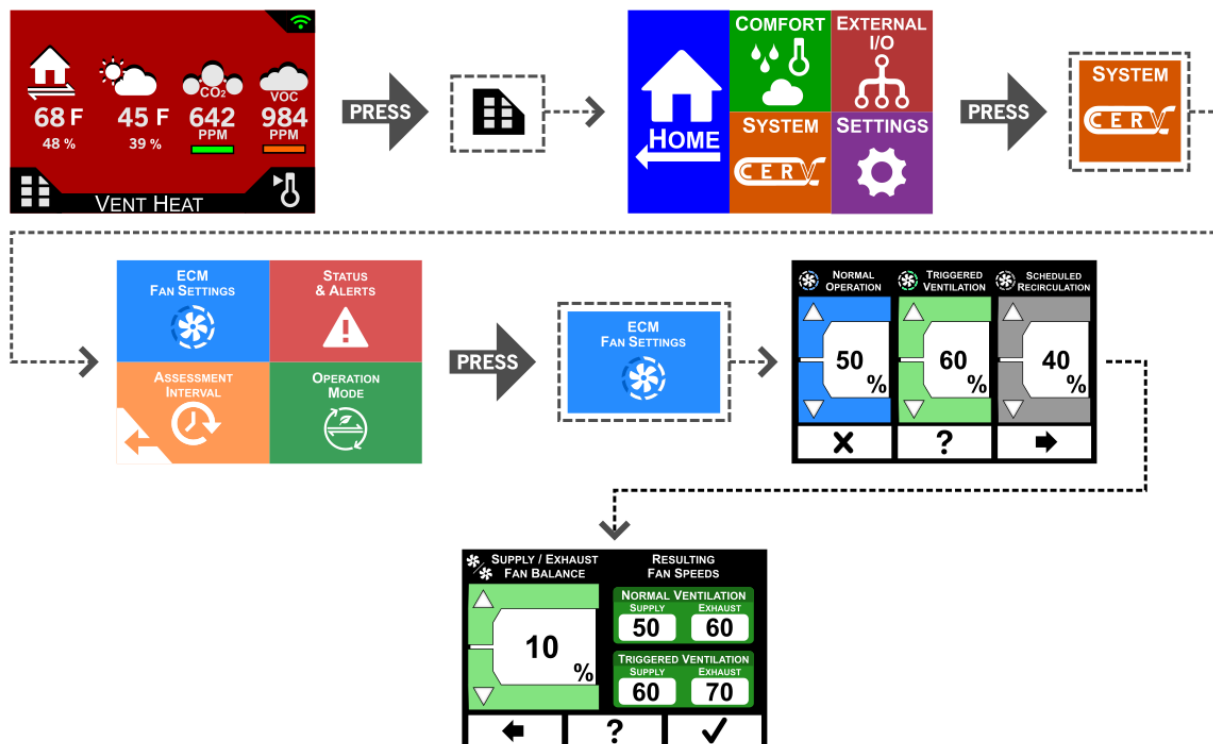
- IOS: Press the menu icon , followed by the "Add to Home Screen" button
- Android: Press the menu icon , followed by the "Add to Home Screen" button

Appendix – Fan Speed Configuration

The inline fans included with the CERV can be configured to help maximize comfort and fresh air delivery to the home. There are three configuration settings for the inline fans:

- **Normal Operation:** This will be the default fan speed for the system as it ventilates, recirculates, heats, and cools your home. In Recirculation Heating and Recirculation Cooling modes, the outside fan may increase to a higher speed to help boost the efficiency and capacity of the CERV.
- **Triggered Ventilation:** If a wireless switch is pressed to trigger a ventilation period, the fans will increase to the Triggered Ventilation fan speed setting. This fan speed setting also applies if you start a timed ventilation event from the wireless controller.
- **Scheduled Recirculation:** When no heating, cooling, or ventilation is needed, but the Scheduled Recirculation setting is greater than 0%, the inside fan will recirculate air throughout the home. This fan speed setting allows you to recirculate at a higher or lower airflow than normal operation.

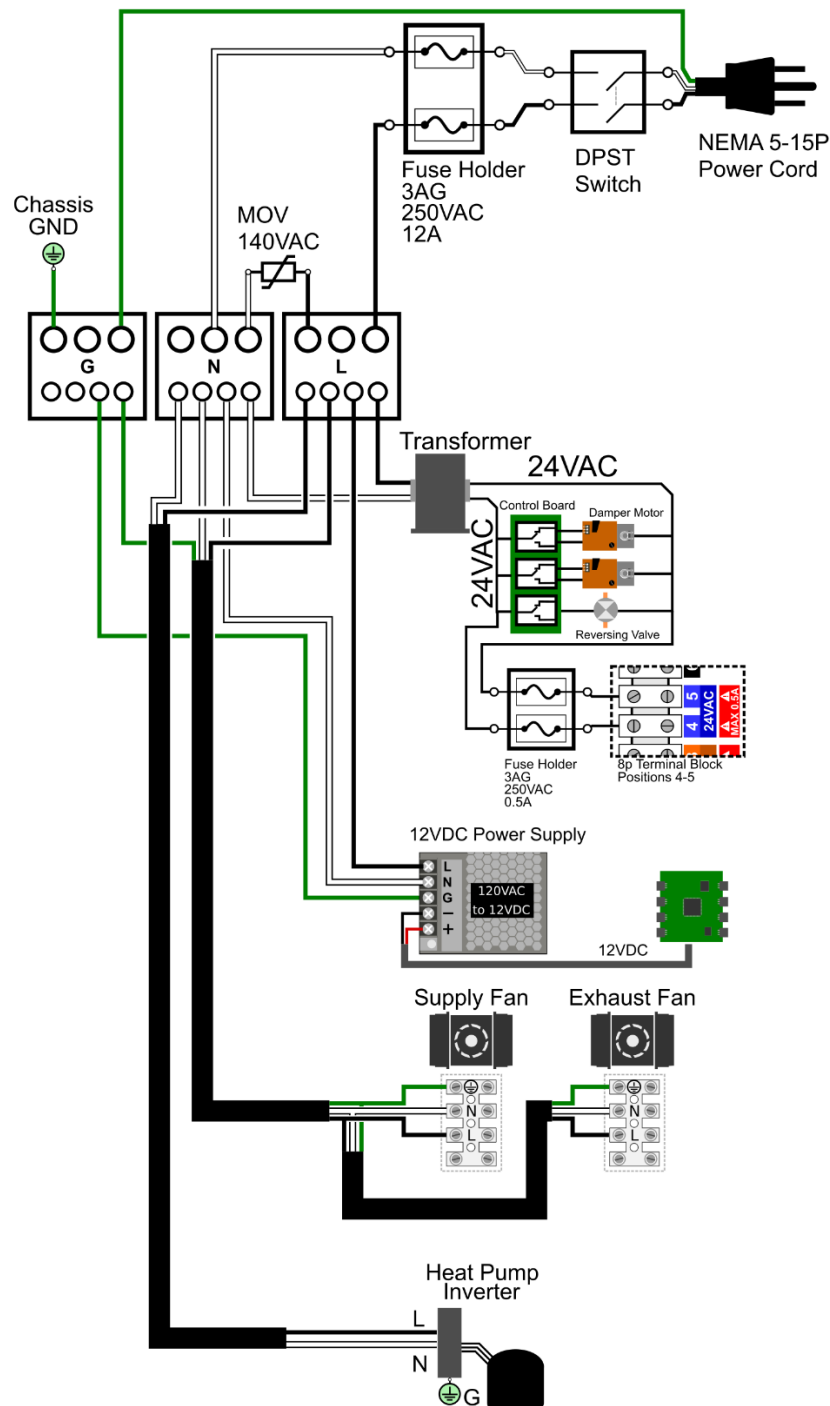
The user may also specify a supply/exhaust fan balance setting for the system. If the fan balance setting is nonzero, the exhaust fan will run higher or lower than the supply fan while ventilating in order to compensate for ducting losses for balanced ventilation. For example, if the user sets a -10% fan balance, and the “Normal Operation” fan speed is 50%, if the CERV is ventilating due to VOC or CO2 levels, the supply fan to the home would run at 50%, and the exhaust would run at 40%. With a +10% fan balance, the supply would be 50% and exhaust would be 60%.



Appendix - Electrical

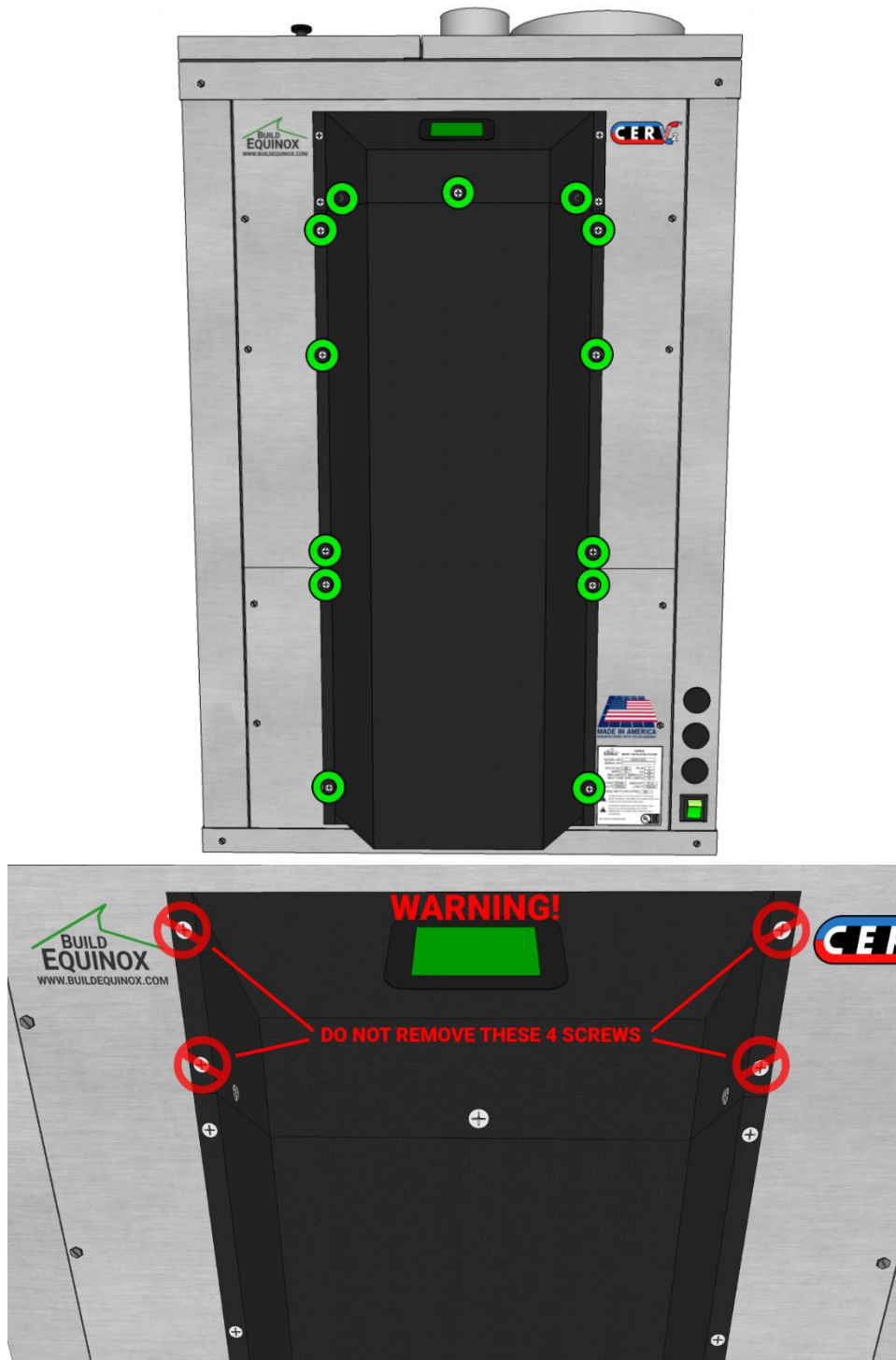
DANGER: risk of electric shock. Can cause injury or death: disconnect all remote electric power supplies before servicing.

CERV Internal Wiring Diagram

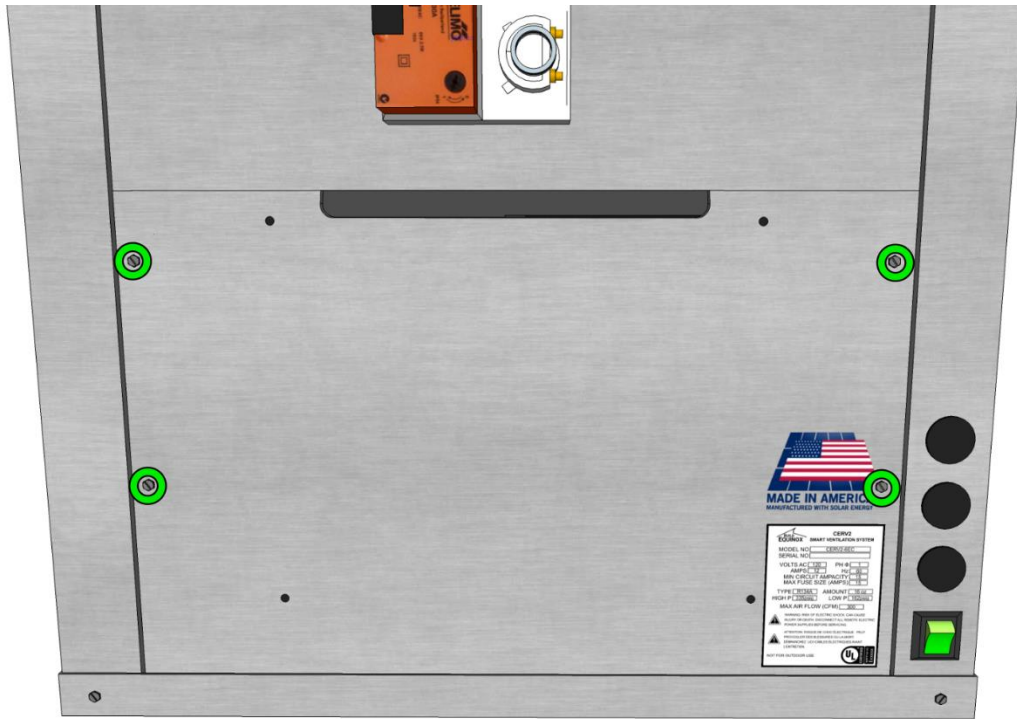


Front Panel Removal and Auxiliary Input/Output (X0 and I0) Access

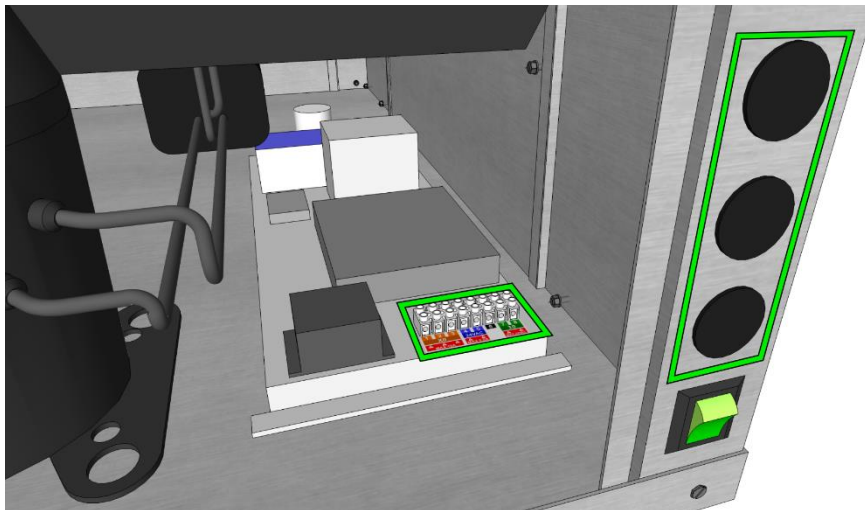
These instructions show how to access the internal input/output connections in the CERV2. Before removing any access covers, power to the CERV2 should be turned off and the unit either unplugged or the electric breaker switched off. Remove the lower front plastic cover by removing the 13 phillips head screws shown below.



Once the lower front cover is off, the four screws for the lower access panel can be removed. Screw locations are shown below. With the screws removed, the panel will be free to come out.

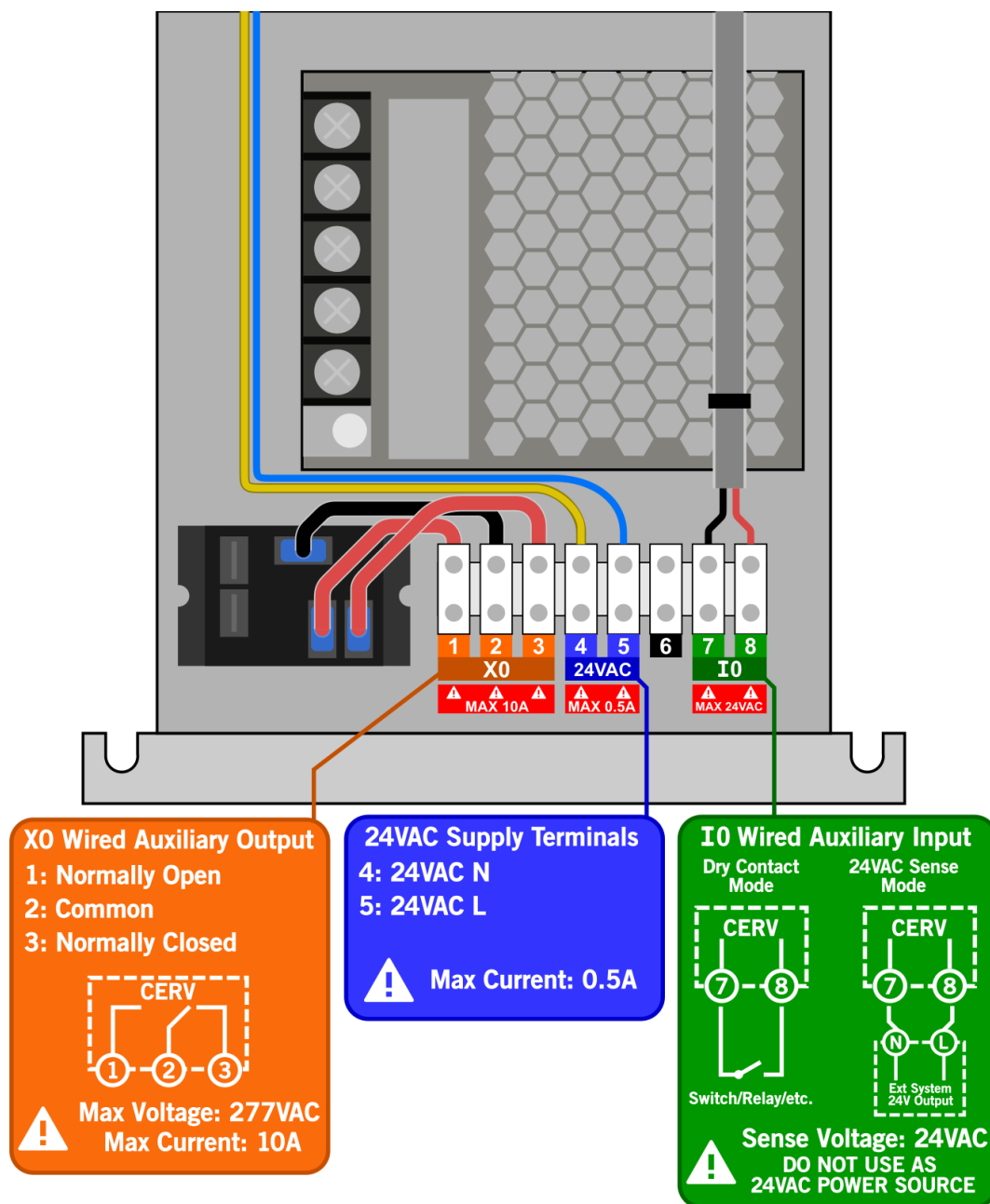


On the right side is the power conditioning and distribution electronics assembly. The I/O terminals are located at the front of this assembly. Three $\frac{3}{4}$ " knockouts are provided for running wires to the I/O terminals. Conduit or wire strain relief fittings should be used in these knockouts.



Built-In Auxiliary Input and Output (X0 and I0)

A schematic of the I/O terminals is shown below. The following sections describe making wired connections to these terminals for several external devices.



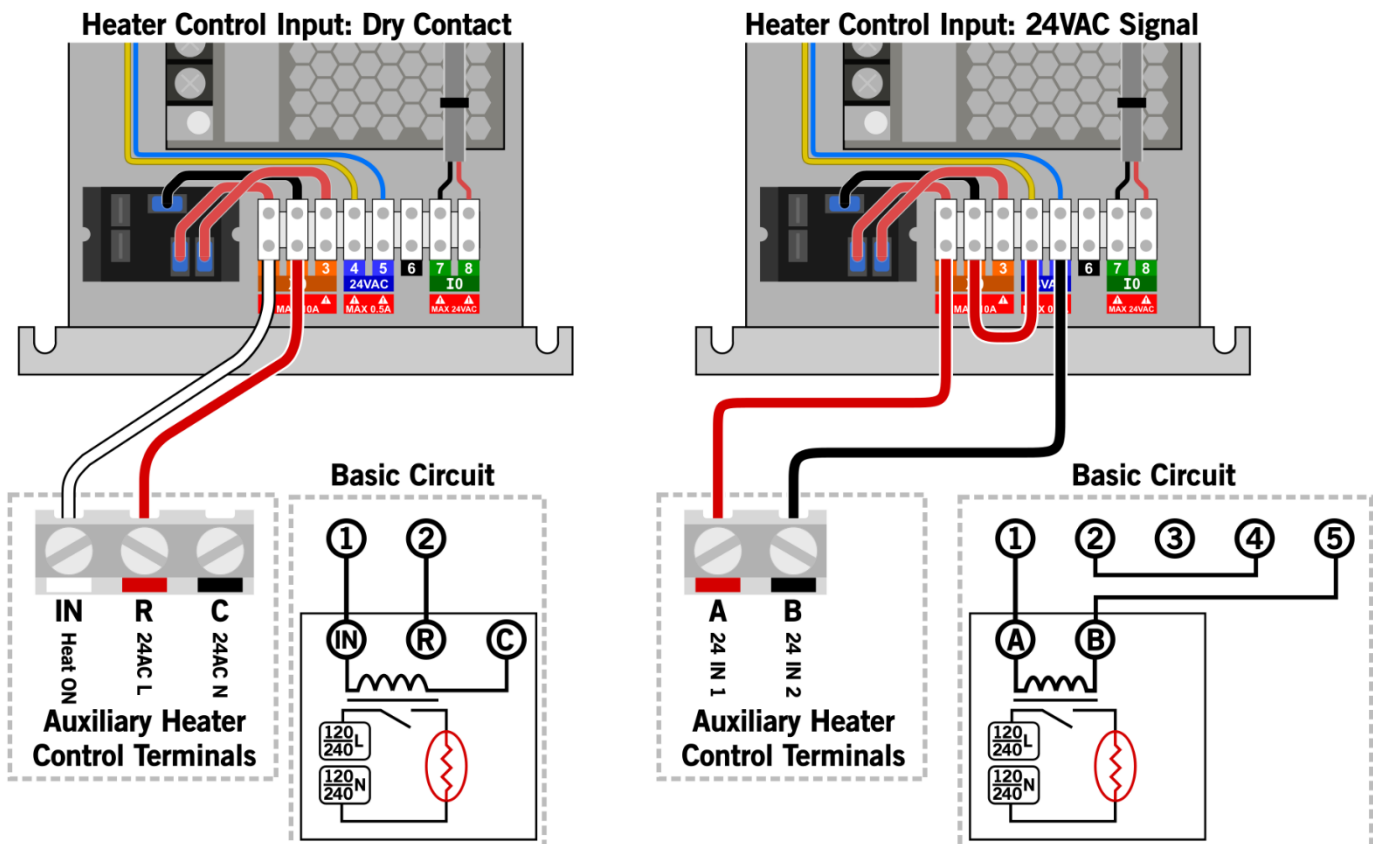
Wired Auxiliary Output Example – Inline Duct Heater (wiring)

The CERV2 can control electric heaters in two ways; dry contact, where the heater is supplying a 24V signal, or 24V signal where the CERV is directly supplying the 24V control signal. Installation should only be performed by a trained professional. Turn power off to CERV2 and unplug or turn off breaker before performing any wiring. Incorrect wiring can damage components and void warranties. Please review your electric heater's installation instructions carefully to see which heater control applies. Schematics below show the wiring configurations for the two cases. In either case, low voltage control wire can be used such as standard 2 conductor thermostat wire.

For the dry contact connection, 24V from the heater is connected to terminal 2 on the CERV2's output channel. Terminal 1 is then wired back to the heater. When the CERV2 activates the heater the relay will close the connection between terminals 1 and 2 allowing the 24V signal to go back to the heater control to activate it.

For the 24VAC signal control connection, a jumper is needed between CERV2 terminals 2 and 4. Terminal 4 is a 24VAC output channel. The control wires from the heater then connect to terminals 1 and 5. To activate the heater the CERV will activate a relay to close the connection between terminals 1 and 2. This allows 24VAC to pass through to the heater's controls to activate heat.

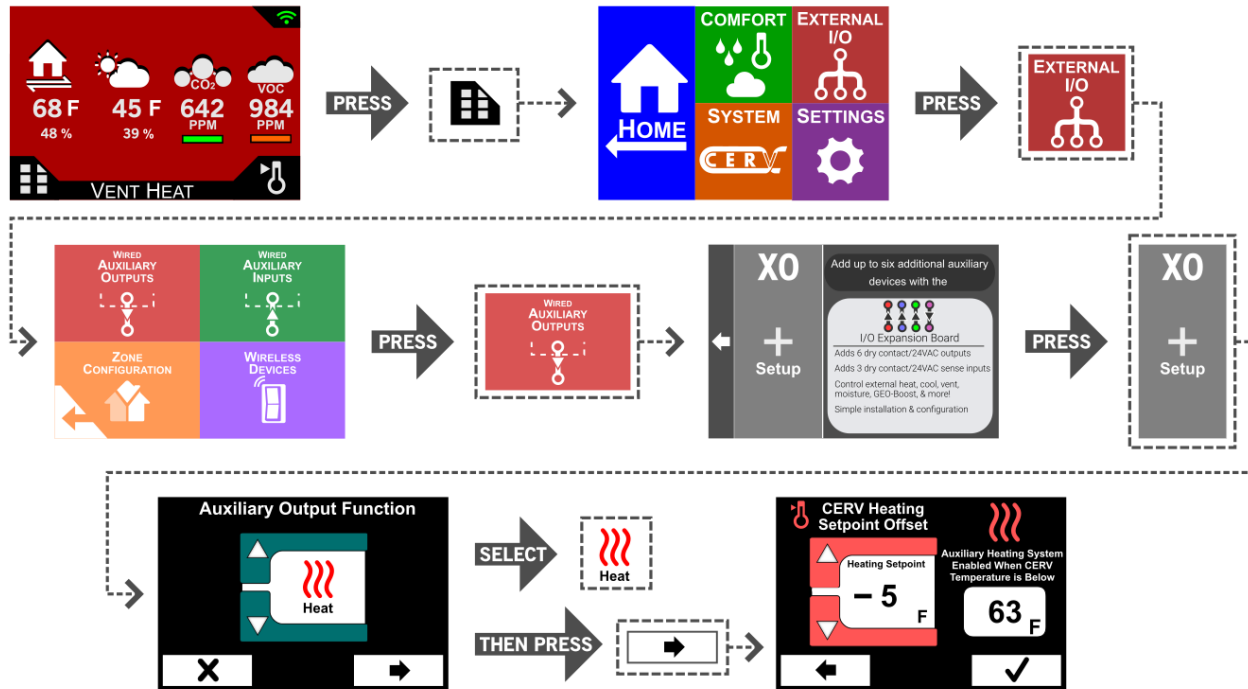
After making the wiring connections, see next section to configure heater on CERV2 controller.



Wired Auxiliary Output Example – Inline Duct Heater (Configuration)

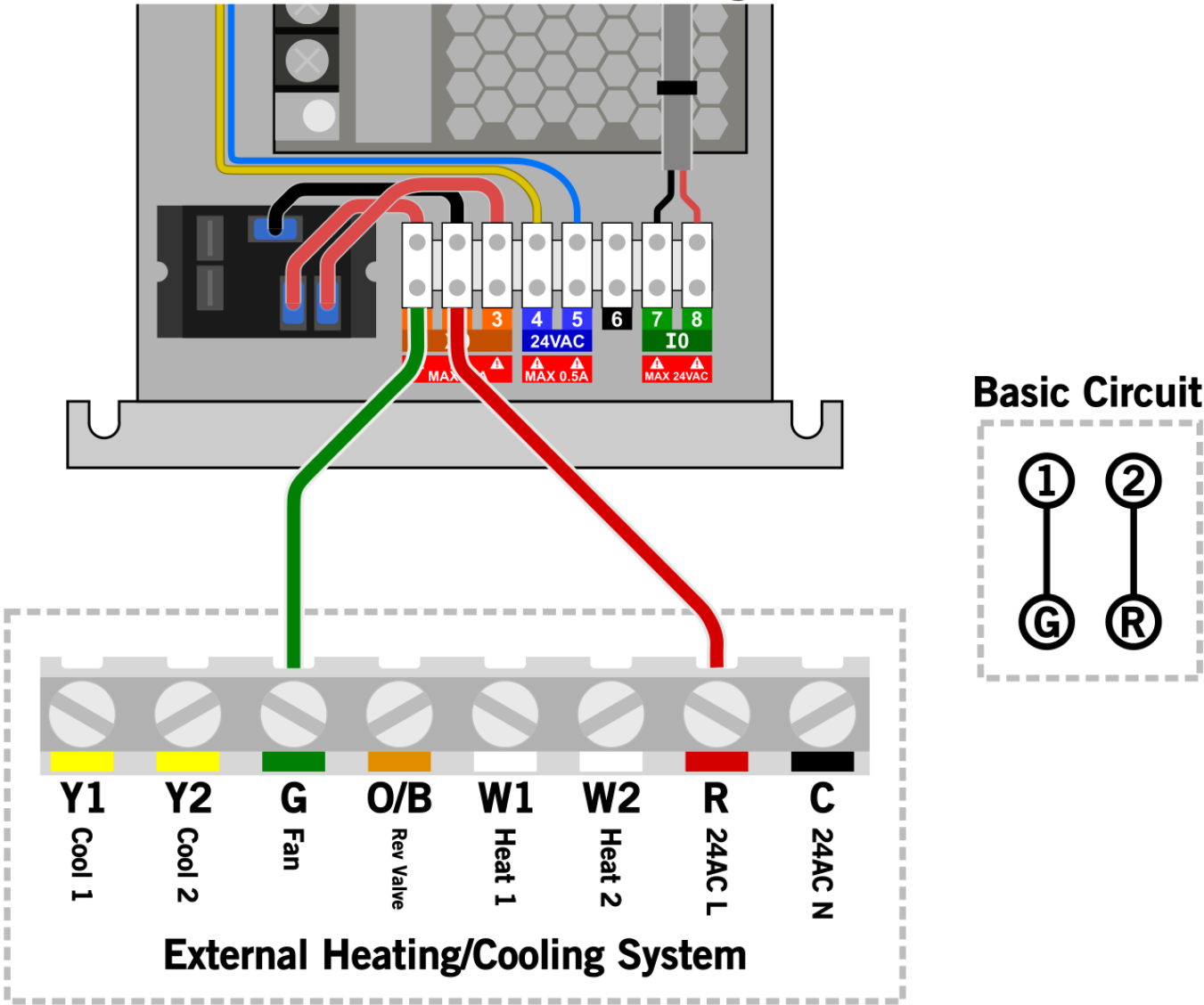
After completing the electric heater wiring, the CERV2 output channel must be configured through the controller. Follow the schematic below. When the external heater is on, a heater icon will appear in the status bar of the home screen located in the upper right corner.

CERV Touchscreen Setup



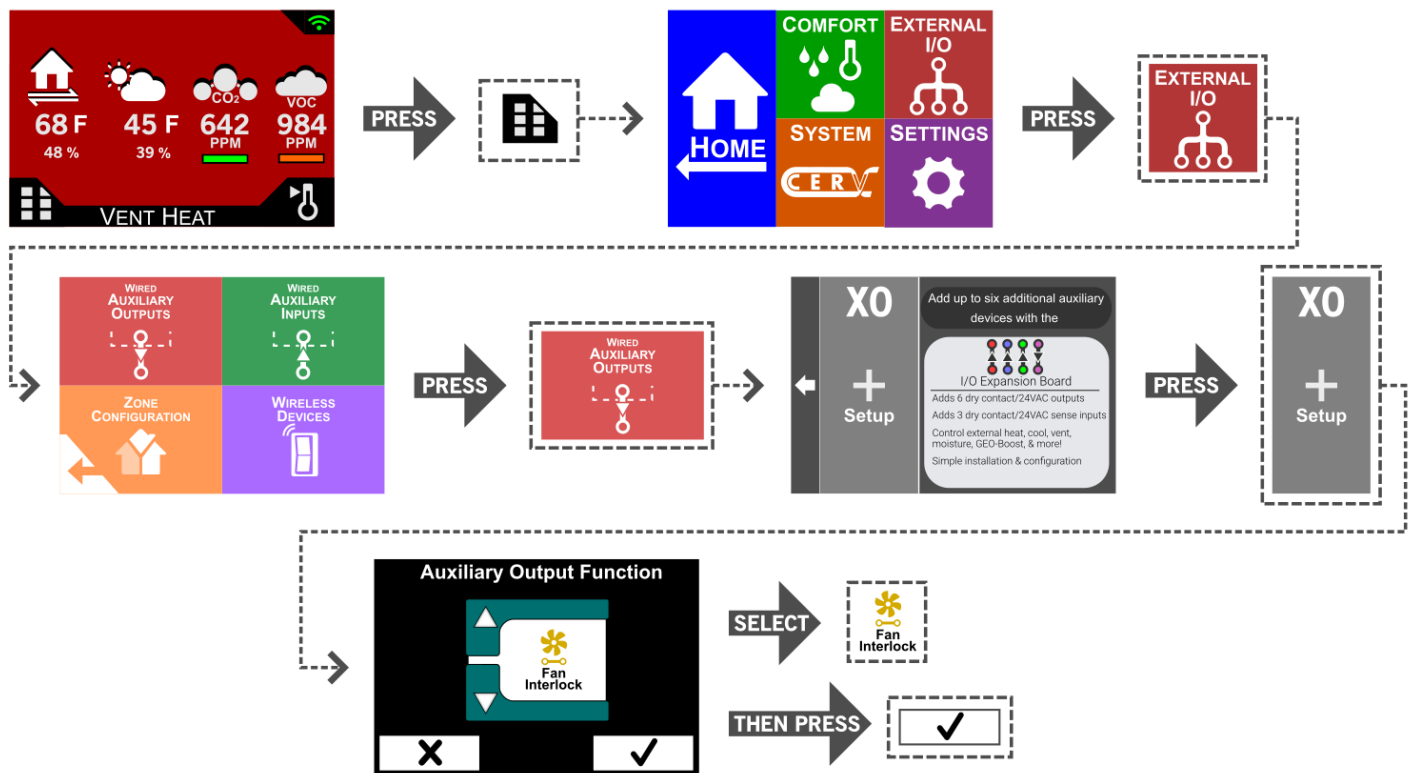
Wired Auxiliary Output Example – Fan Interlock (wiring)

Electrical Wiring



Wired Auxiliary Output Example – Fan Interlock (Configuration)

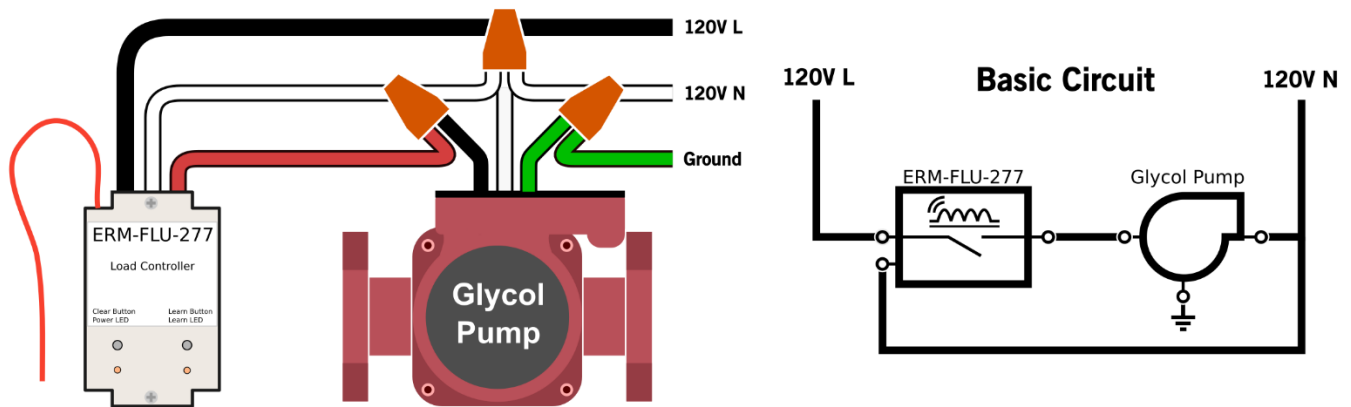
CERV Touchscreen Setup



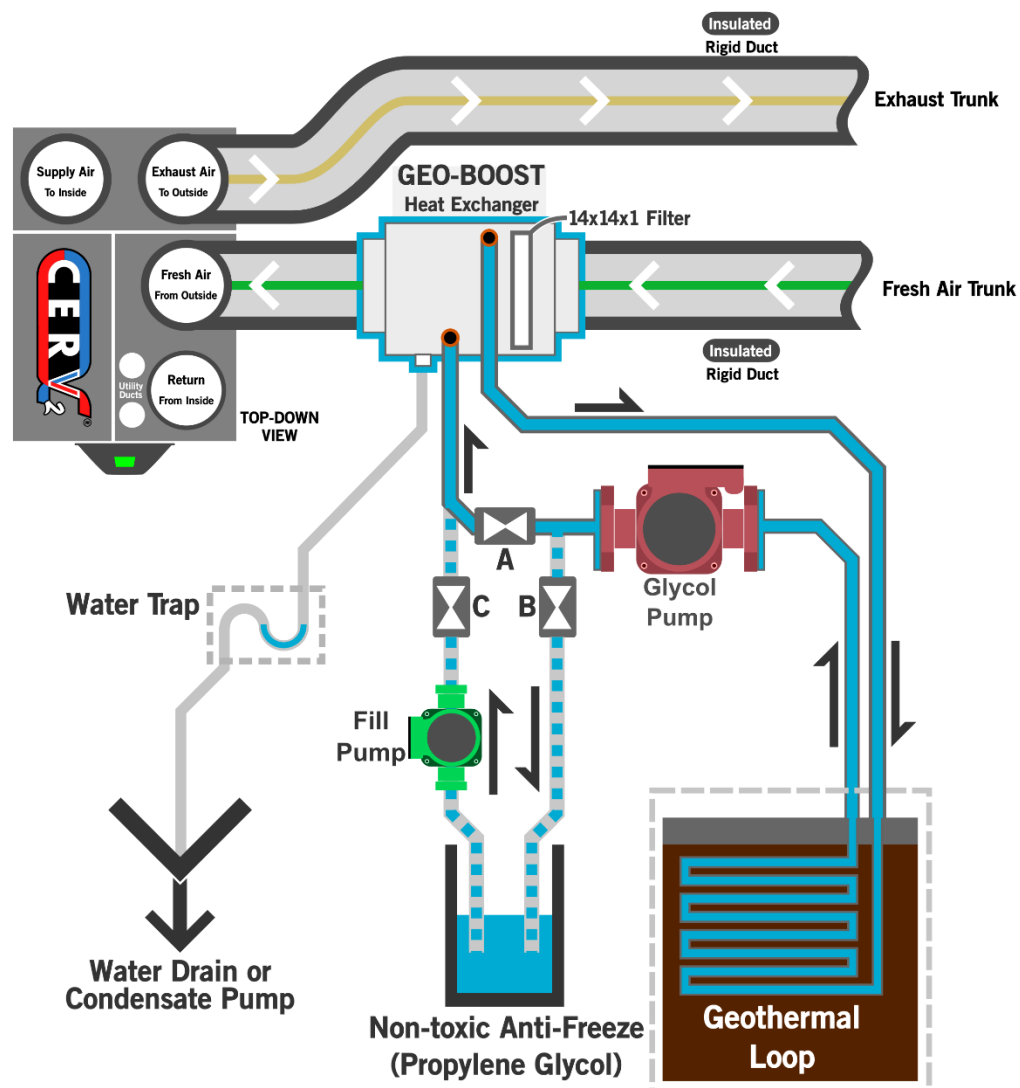
Fan Interlock Notes:

When an Auxiliary Output is configured with the Fan Interlock functionality, the CERV will enable the output relay, connecting the Normally Open and Common terminals internally. This will occur any time the CERV fans are operating. When the CERV goes into the Off operational mode, the output relay is disabled.

Wireless Auxiliary Output Example – GEO Boost (Wiring)

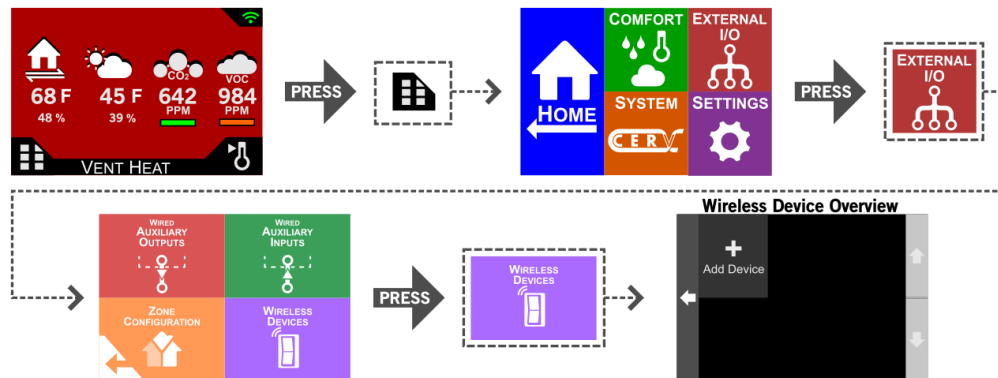


Ducting and Glycol Loop Configuration

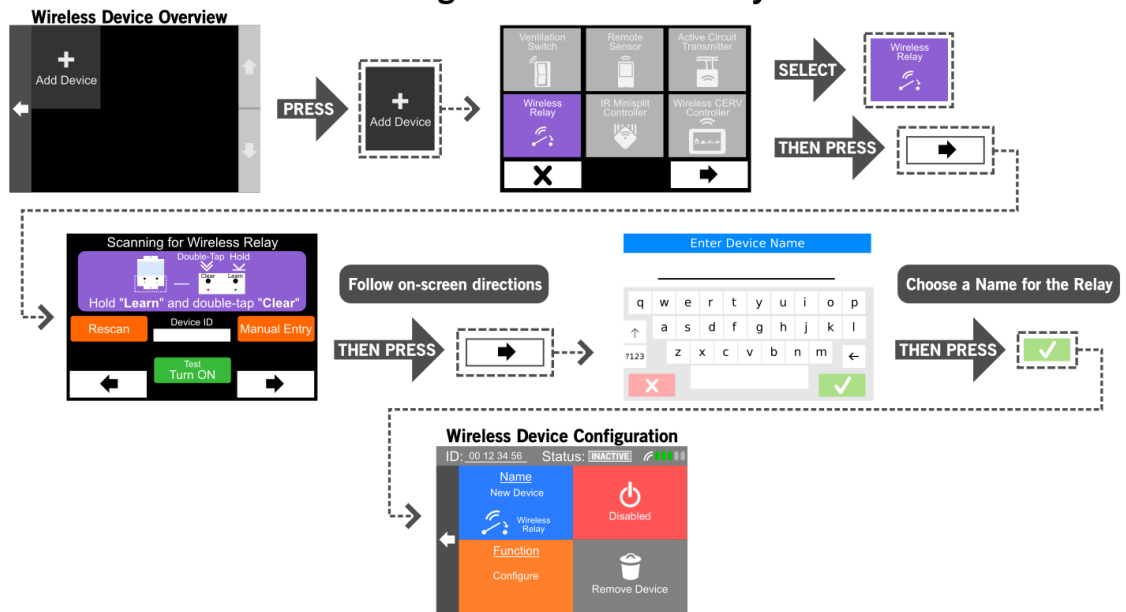


Wireless Auxiliary Output Example – GEO Boost (Configuration)

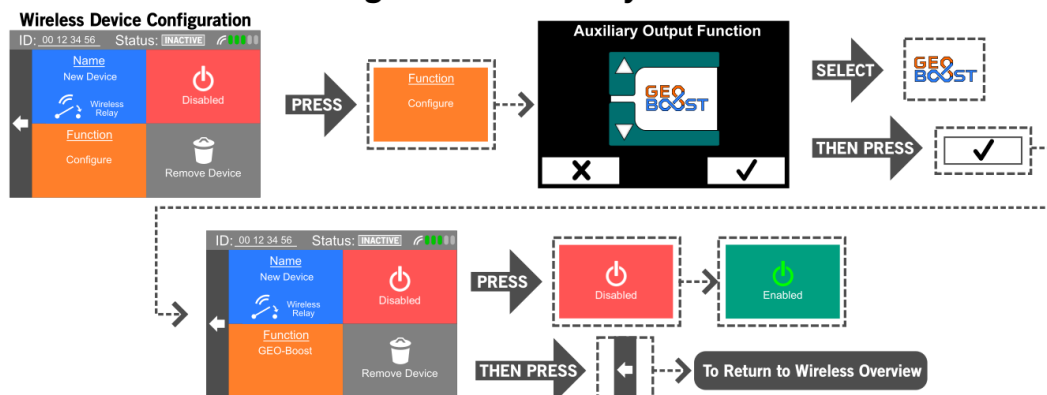
Wireless Device Management



Adding A New Wireless Relay



Configure Wireless Relay as GEO-Boost



GEO Boost Notes

When an output has been configured as a GEO Boost, the CERV internally handles the logic required to determine when conditions are right to enable or disable the glycol pump. Depending on indoor and outdoor conditions, the GEO Boost may do periodic assessments, turning on or off to calculate its contribution to efficiency and capacity of the CERV as a whole. Because of this, no further configuration, setpoints or otherwise, is needed from the user.

If you would like to check the GEO Boost pump operation manually, you can simply disable, then re-enable device. This will cause the GEO Boost to turn on and re-assess for several minutes.

[illegible]

[illegible]



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