



CERV WIRELESS TOUCHSCREEN CONTROLLER

USER'S MANUAL



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

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CONTROLLER OVERVIEW

The CERV's wireless touchscreen controller puts control of your indoor air quality literally into your hands, providing a gateway to the most advanced air quality management system available today. While the CERV uses complex algorithms and computations to optimize your indoor air quality, the touchscreen interface was built to be simple, easy to read, and intuitive. From the controller, you can easily view real time air quality and comfort conditions in your home and configure the CERV's settings or auxiliary devices. This guide serves as a reference to allow you to maximize your understanding of how to configure the CERV to serve you best. Refer to the CERV Operation Manual for more information on the CERV's system components, modes of operation, and recommended settings.

Air quality, temperature, and relative humidity are measured directly at the CERV, and then relayed wirelessly to the touchscreen controller, allowing flexibility to locate the controller wherever convenient. The controller can be placed on a flat surface or mounted to a wall using the bracket attached to the back of the controller enclosure. A wall outlet is all that is needed to plug in the power supply. CERV setpoints and configurations are stored locally on the CERV's control board memory, so powering the touchscreen is not necessary for the CERV to operate. Checking CERV status or making any changes will require use of either the touchscreen controller or the CERV-ICE internet gateway, which allows online control and monitoring as well as other features. More information on CERV-ICE can be found at <http://buildequinox.com/products/cerv/cerv-ice/>.

CONNECTING THE CONTROLLER

To use the touchscreen controller, make sure that both the touchscreen and CERV are powered. The touchscreen should start receiving data shortly after power is applied, so it may take a moment to connect. There will be a green wireless signal  in the upper right corner of the screen if the wireless touchscreen controller is properly connected to the CERV. If this wireless symbol is gray with a red X  there is 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. While the wireless network used is often robust enough to allow access throughout the entire home, in some cases the touchscreen may be out of range and need to be moved closer to the CERV.



Touchscreen controller

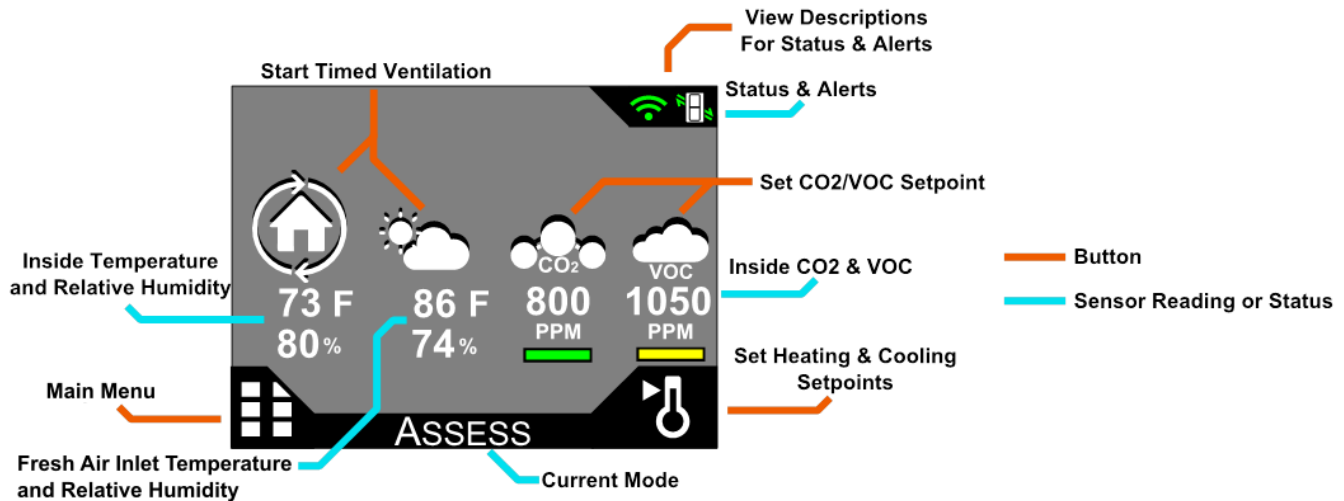


Power supply

HOME SCREEN

OVERVIEW:

The Home Screen displays the current temperature, relative humidity, CO₂, VOC, and status of the CERV. It additionally provides quick access to other screens, such as heating and cooling setpoints, timed ventilation, status and alerts, and the Main Menu.



The background color of the screen, along with some of the icons will change depending on the CERV's current operating mode. The possible modes are:

- **Assess** – The CERV is recirculating air throughout the house in order to obtain current readings of the home's overall health and comfort. If the CERV is within all setpoints and does not need to ventilate, heat, or cool, it will revert to its standby "off" mode. Assessment is 2 minutes in duration and time between assessments depends on the Assessment Interval (see pg 15).
- **Vent (Heat/Cool/Setpt)** – The CERV will ventilate the home for various reasons. The CO₂/VOC levels may have gone above setpoint, a wireless ventilation switch was triggered, a timed ventilation event may have been started, or the CERV may be using outside air to heat or cool the home. If the home is within the heating and cooling setpoints, but the CERV is ventilating, the screen will be green and the current Mode will show Vent Setpt. A red or blue screen will appear if the CERV is heating or cooling while in ventilation mode.
- **Recirc (Heat/Cool)** – If ventilation is not needed, but the inside temperature is outside the bounds of your heating or cooling setpoint, the CERV will go into a recirculation heating or cooling mode. The screen will be red or blue depending on heating or cooling mode.
- **Off** – The CERV has determined that your air quality is acceptable and your inside temperature is satisfactory. It will conserve energy by turning itself off. The screen will be gray while in this standby mode. The CERV fans will come on periodically for the assessment period.

Other Notes:

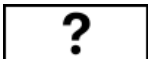
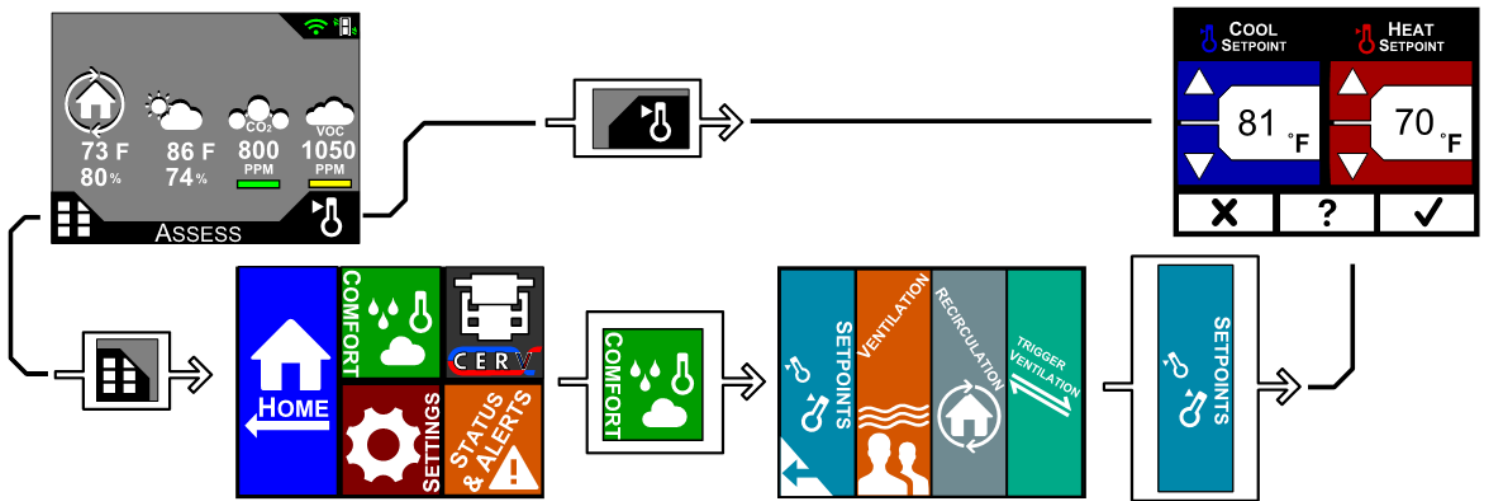
The colored bars below the CO₂/VOC readings indicate how the current air quality levels compare to the setpoint. Green indicates that your air quality is acceptable, yellow indicates that the pollutant level is nearing the ventilation setpoint, and orange indicates that the pollutant level is above the setpoint and the CERV is ventilating or will start doing so shortly.

HEATING AND COOLING SETPOINTS

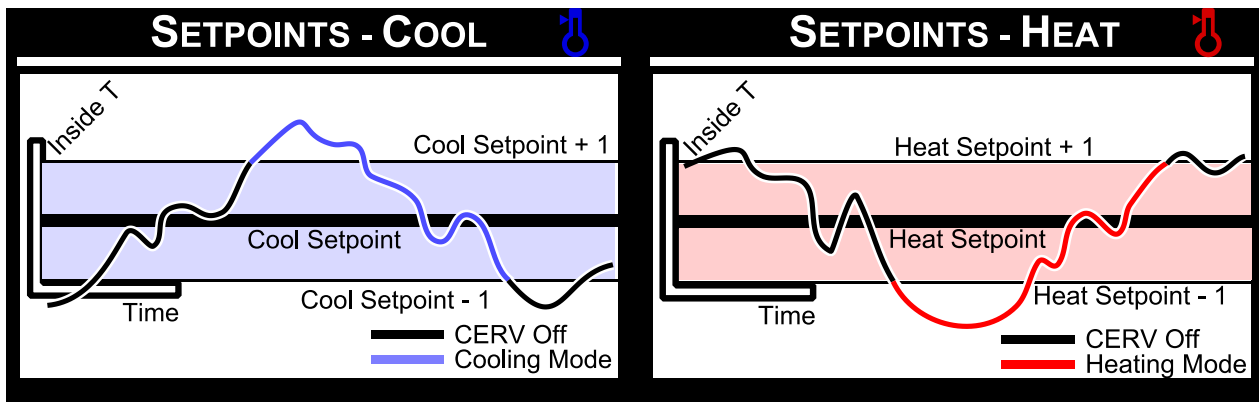
OVERVIEW:

On this screen, you may configure your heating and cooling setpoints for the CERV. There are two paths to get to the heating and cooling setpoint screen. From the Home Screen simply press the thermometer icon or go through the Main Menu. On the temperature setpoints screen you may change either setpoint and then press the checkmark to accept the change. To reject the changes or make no change, press the . After pressing either the checkmark or the X you will be taken to the previous screen.

Note: The lower bound of the cooling setpoint is two degrees F above the current heating setpoint. Likewise, the highest the heating setpoint can be set is 2 degrees below the current cooling setpoint. It may be necessary to move one setting first in order to move the other.



On many screens you will notice a “?” button. Pressing this button will take you to a Help Screen for the screen you are currently on. The Help Screen provides detailed information on the current screen including what settings can be changed and how these settings relate to the CERV’s operation. Below is the help screen for the Temperature Setpoint screen. This demonstrates how the CERV operates in heating or cooling mode in relation to the setpoints. Data shown on the help screen is only representative.

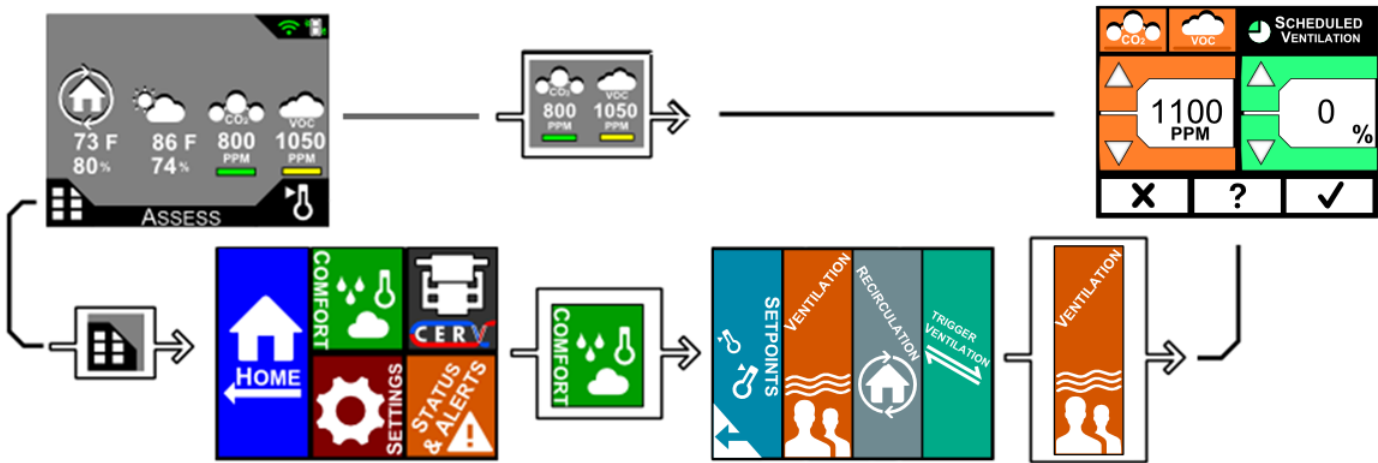


CO2/VOC AND VENTILATION SETPOINTS

OVERVIEW:

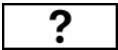
On this screen, you may configure your ventilation setpoints for the CERV. Like the Temperature Setpoint screen, there are two paths that take you to the Ventilation Setpoints. On the left side of the screen are the CO2 and VOC sensor settings. The CERV is a demand controlled ventilation (DCV) system and has independent CO2 and VOC sensors. These sensors are controlled with a single setpoint. If the CO2 or VOC sensors read above the PPM (parts per million) setpoint, the CERV will go into fresh air ventilation mode to bring the air quality back to an acceptable level. Clicking on the CO2 or VOC buttons at the top will disable or re-enable either sensor. An orange background on the button indicates the sensor is enabled, while gray indicates the sensor is disabled.


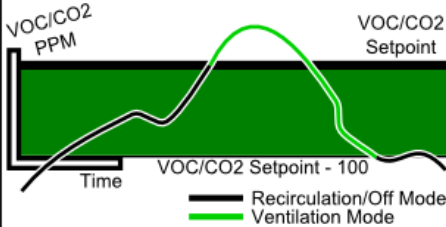




The right side of the screen lets you set scheduled ventilation where the CERV will ventilate for the chosen % out of an hour regardless of the CO2 and VOC sensor readings. For example, 10% would ventilate 6 minutes out of every hour. This can be used in addition to the demand controlled ventilation (DCV) or in place of DCV if the pollutant sensors are turned off.



RECOMMENDATIONS:

Recommend Ventilation Setpoint is 900 to 1100PPM. Studies have shown that levels above 1000PPM can indicate that a home may have detectable odors as well as negative effects on productivity, alertness, and general comfort. In some rare cases, outside air may actually be more polluted than the air inside your home. In this case bringing in outside air will increase the pollution level inside, rather than decrease it. This could be due to neighbors burning leaves, wood burning stoves, etc. In this type of situation, you may choose to disable the CERV's affected CO2 or VOC sensor until the situation is resolved.

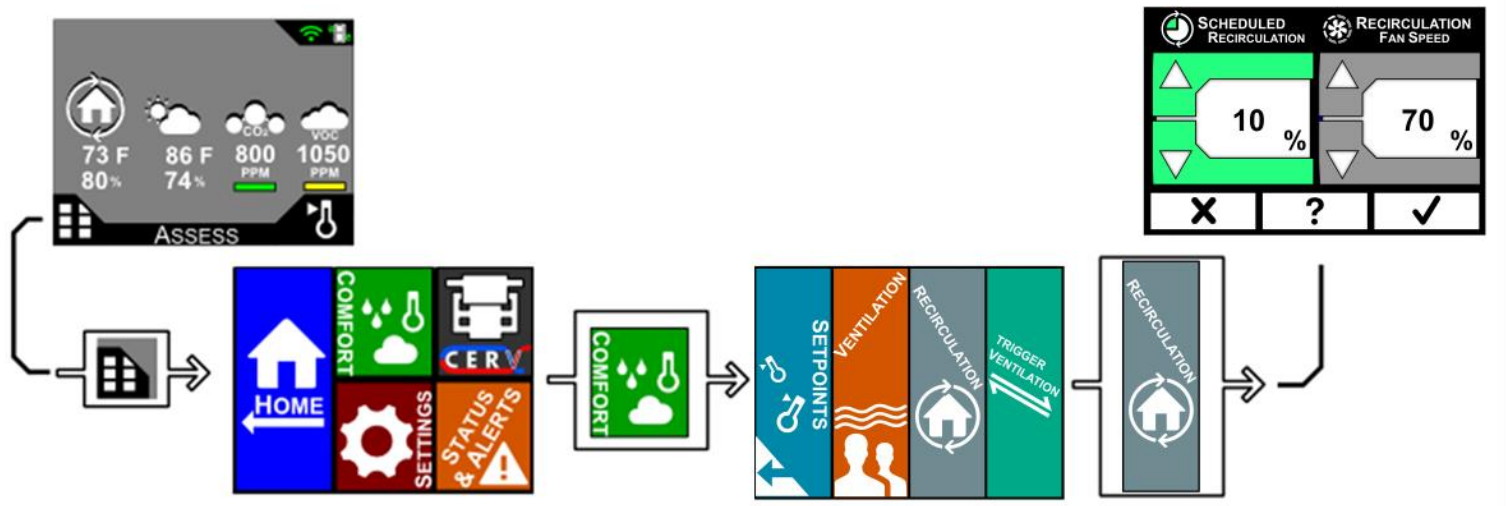


HELP VENTILATION SETPOINT	HELP VENTILATION SETPOINT	HELP SCHEDULED VENTILATION
 Both CO ₂ and VOC will be used to control indoor air quality.		 Scheduled Ventilation Level
 Only VOC will be used to control indoor air quality.		This is the base fraction of time (per hour) that the CERV will ventilate. For example, a Scheduled Ventilation level of 10% means that the CERV will ventilate for 6 minutes out of every hour. If the Ventilation Setpoint is enabled, a setting of 0% will allow the CERV to operate purely based on its indoor air quality sensors (recommended).
 Only CO ₂ will be used to control indoor air quality.		
 Neither CO ₂ or VOC will be used for indoor air quality control.		

RECIRCULATION

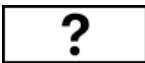
OVERVIEW:

Scheduled Recirculation can be used to move air throughout the home during times when the CERV would otherwise be off because no heating, cooling, or ventilation is needed. This Scheduled Recirculation setting is reached through the Comfort Menu. By setting the Scheduled Recirculation setpoint, the CERV will spend the set % of the Assessment Interval time in Recirculation Mode. For example, if the Assessment Interval is set to 10 minutes and the Scheduled Recirculation set to 10%, the CERV will recirculate for 1 minute out of the 10 minute interval. During recirculation, only the inside supply fan is powered. See pg 17 for information on the Assessment Interval.



RECOMMENDATIONS:

The time available for scheduled recirculation will depend on time needed for ventilation, heating, or cooling because this recirculation is only possible at times when all setpoints are satisfied. Setting to 100% will ensure constant movement of air throughout the home. Initially leaving it at 0% will allow user to evaluate CERV's time spent in off mode and if an increase in Recirculation % is desired to move air during down time.



HELP SCHEDULED RECIRCULATION

Scheduled Recirculation Level

This is the percentage of time that the CERV will recirculate when no other ventilation or conditioning is needed (i.e. the unit would normally be off). Setting this value may help encourage air mixing between floors and rooms of the building, providing a more uniform and comfortable living environment.

HELP SCHEDULED RECIRCULATION

Recirculation Fan Speed

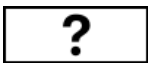
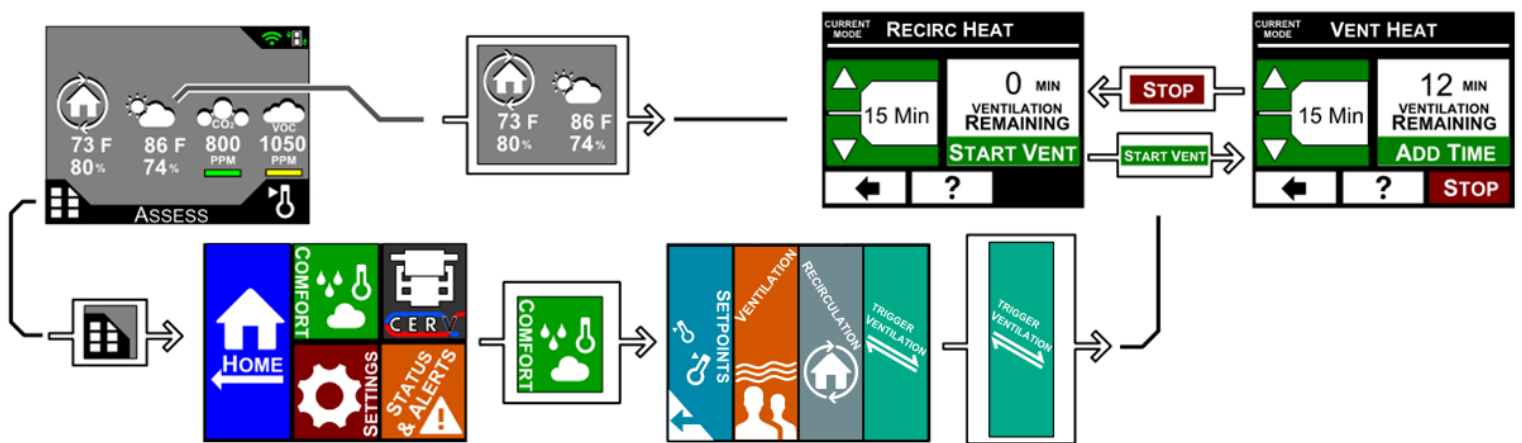
When the CERV is running in the Scheduled Recirculation period, the indoor fan speed can be set to the desired level. This may be above or below the normal operation fan speed setting.

TRIGGER VENTILATION

OVERVIEW:

From the Home Screen or through the Comfort Menu you can trigger a timed ventilation event. Trigger Ventilation lets you force the CERV into ventilation mode for a specified amount of time. If you are cooking or have another event that may produce moisture or odors for which you require ventilation, this function can be used. Even though the CERV will detect pollution and ventilate automatically, there can be a delay between the production of the pollution and when the CERV detects it. Proactively ventilating can help mitigate propagation of pollution in the home.

To use the function, change the time to the desired length and then press Start Vent. The CERV will switch into vent mode and the time remaining will begin counting down. If you would like to cancel the ventilation at anytime, press the stop button. On the home screen an hourglass icon will appear in the status bar while the ventilation event is occurring.



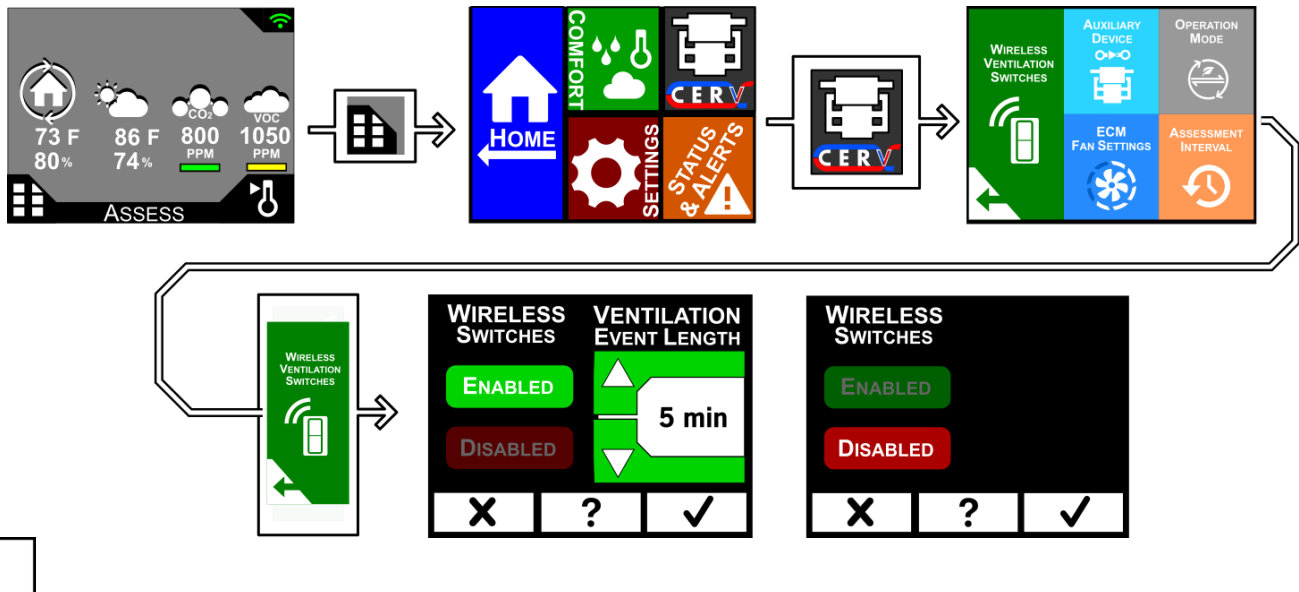
TIMED VENTILATION

- START VENT** Start a timed ventilation event with the specified amount of time.
- ADD TIME** Add the specified amount of time to the timed ventilation event.
- STOP** Stop the current timed ventilation event.
This will not stop ventilation due to VOC/CO2 setpoints, minimum ventilation setting, or wireless ventilation switches.

WIRELESS VENTILATION SWITCH

OVERVIEW:

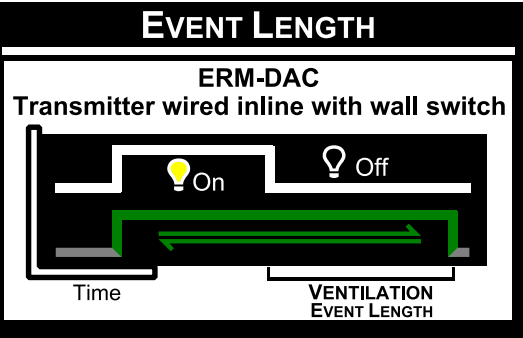
If you purchased the CERV wireless switch option, you will need to enable this option on the controller and then configure the ventilation event length for when the switch is activated. This is done through the CERV Settings Menu. Your configuration may vary depending on whether you are using the battery-free wireless rocker wall switches (PTM265) or the active circuit transmitter (ERM-DAC) wired in-line with an existing wall switch or other circuit. For the wall switch, the CERV will vent for the set event length starting when the switch is pressed before resuming normal operation. The active circuit transmitter operates a little differently. When the circuit that the transmitter is connected to is turned on the CERV will begin to ventilate. When the circuit is turned off, the CERV will continue to ventilate for the set event time length before resuming operation. See CERV Installation Manual for installing the wireless switch option.



EVENT LENGTH

ERM-DAC
Transmitter wired inline with wall switch

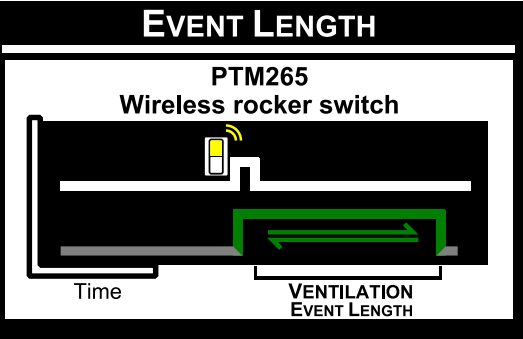
CERV begins ventilating when the switch is turned on. When the switch is turned off, the CERV will continue ventilating for the specified Ventilation Event Length time, and then return to normal operation.



EVENT LENGTH

PTM265
Wireless rocker switch

CERV begins ventilating when the switch is pressed. The CERV will continue ventilating for the specified Ventilation Event Length time, and then return to normal operation.

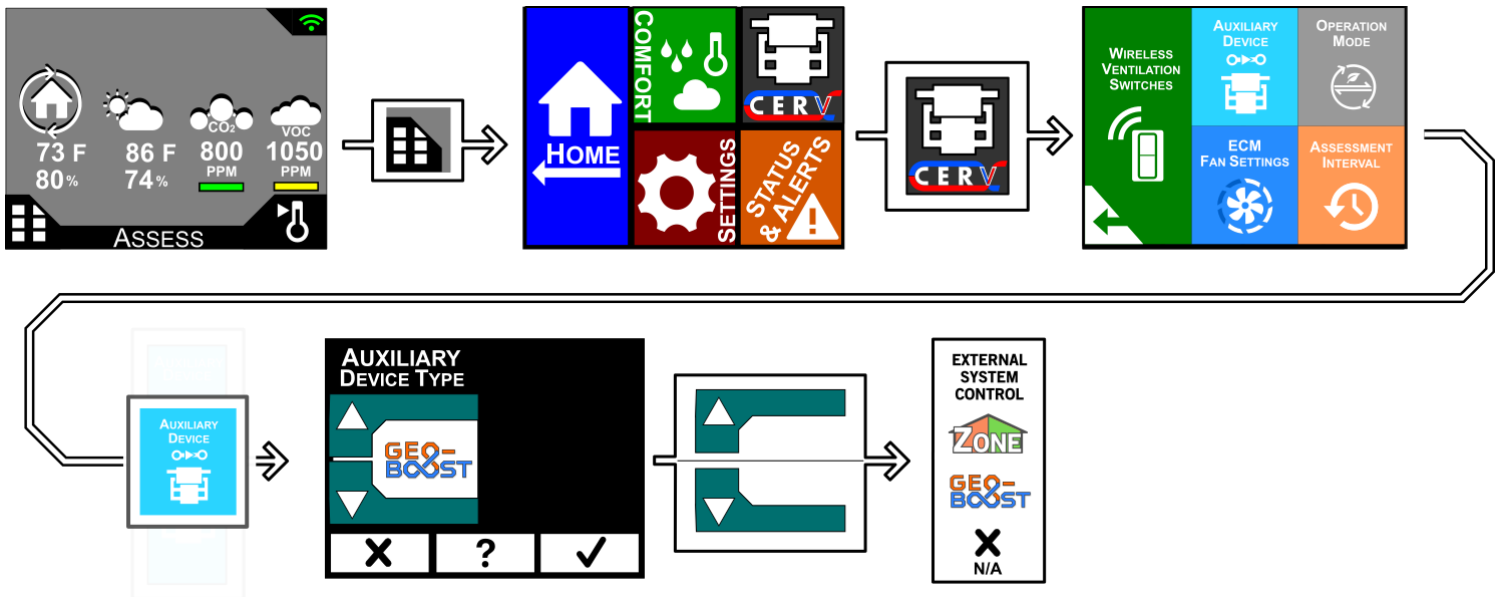


AUXILIARY DEVICE

OVERVIEW:

The CERV can control external auxiliary devices with different functions. When enabled on the controller, these devices are controlled through either a wired connection or wirelessly. Default selection is N/A if no device is to be used. Available auxiliary device choices are listed below followed by setup for each device. See the individual product brochures for more information on each auxiliary device.

- N/A – If no auxiliary device is attached to the CERV.
- Geo-Boost – Ground loop heat exchanger enables the CERV to act as a hybrid air/ground source heat pump by using the sub-surface ground temperature to pre-heat or pre-cool the incoming fresh air when beneficial.
- Zone System – Through the use of the CERV's Zone damper system, the CERV is able to manage the air (both air quality and temperature) in two independent zones.
- External System Control - Build Equinox's Hydro-EX heat exchanger adds supplemental hydronic post-heating and/or post-cooling to the system. Backup electrical duct heating and supplemental ventilation may also be controlled through this auxiliary type.



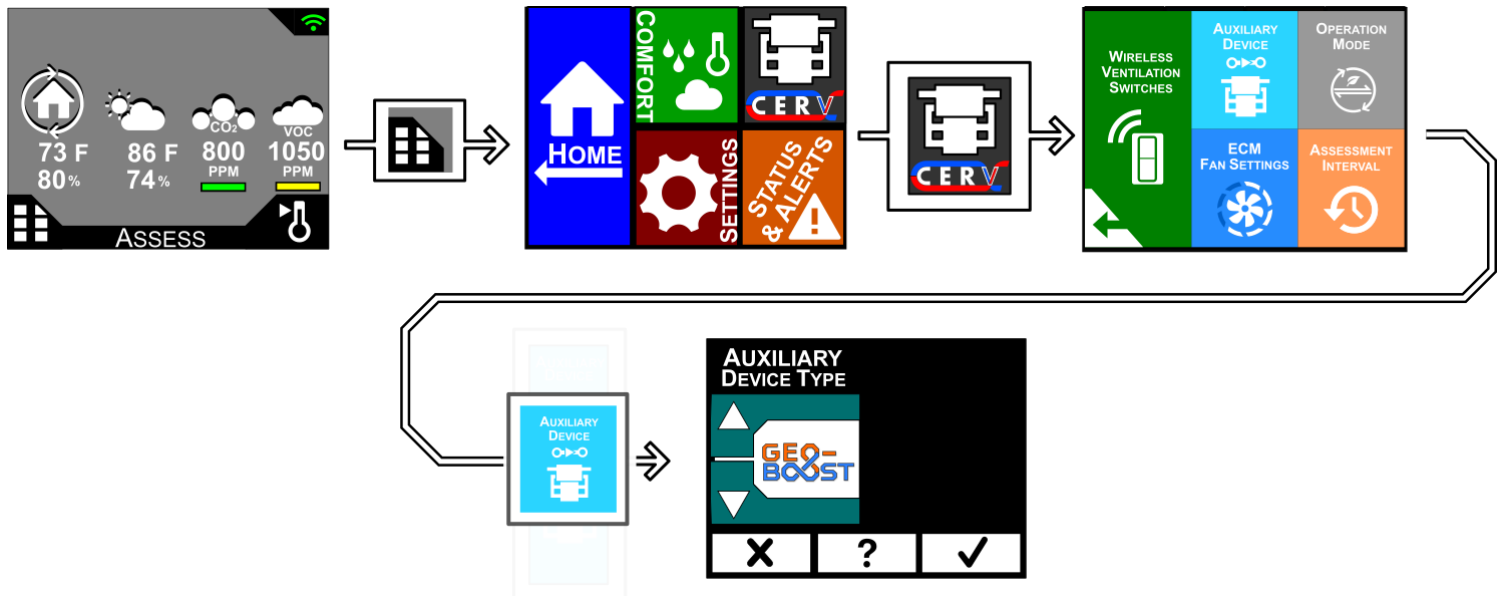
Please continue to the following sections for more information on setup and configuration of specific auxiliary devices. Unless otherwise stated, the CERV Installation Manual should be used for installing any auxiliary device.

Auxiliary Device – Geo-Boost

OVERVIEW:

Geo-Boost converts the CERV into a hybrid geothermal-air source heat pump, increasing both heating and cooling capacities and efficiencies. The Geo-Boost unit is connected to a geothermal loop to make use of steady ground temperatures, which allows the incoming fresh air to be either pre-heated or cooled before going to the CERV.

The CERV is able to intelligently determine when the Geo-Boost provides beneficial heating or cooling to the system through the use of its internal sensors and algorithms. This is done by the CERV, so no external inputs from the user are necessary. Once the Geo-Boost option has been enabled it will operate automatically. See the Geo-Boost product brochure and manual for more information and installation instructions.



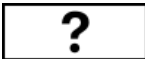
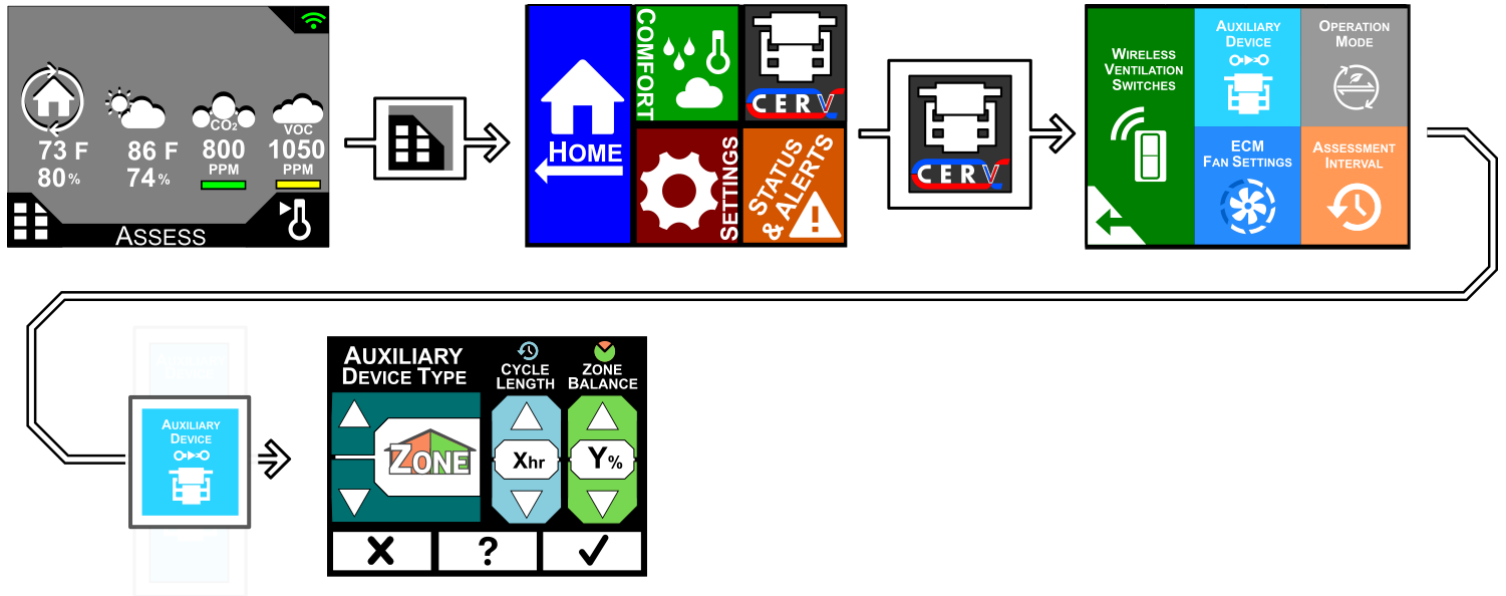
RECOMMENDATIONS:

No Configuration is needed for this Auxiliary Device.

Auxiliary Device – Zone

OVERVIEW:

Through the use of the CERV's optional Zone damper system, the CERV gains the capability to independently managing air quality and temperature in two separate zones. The CERV will spend a period of time (based on the Cycle Length and Zone Balance parameters) on one zone, then switch to the other for the remainder of time. An indicator of the active zone can be seen from the home screen's status.



HELP ZONE Settings

		ZONE 1	ZONE 2
CYCLE LENGTH	ZONE BALANCE	Y%	100% - Y%
Xhr	Y%	X Hours	

Example: With a Cycle Length of 2hrs, and a Zone Balance of 30%, the CERV would spend 36 minutes in Zone 1, and 84 minutes in Zone 2.

RECOMMENDATIONS:

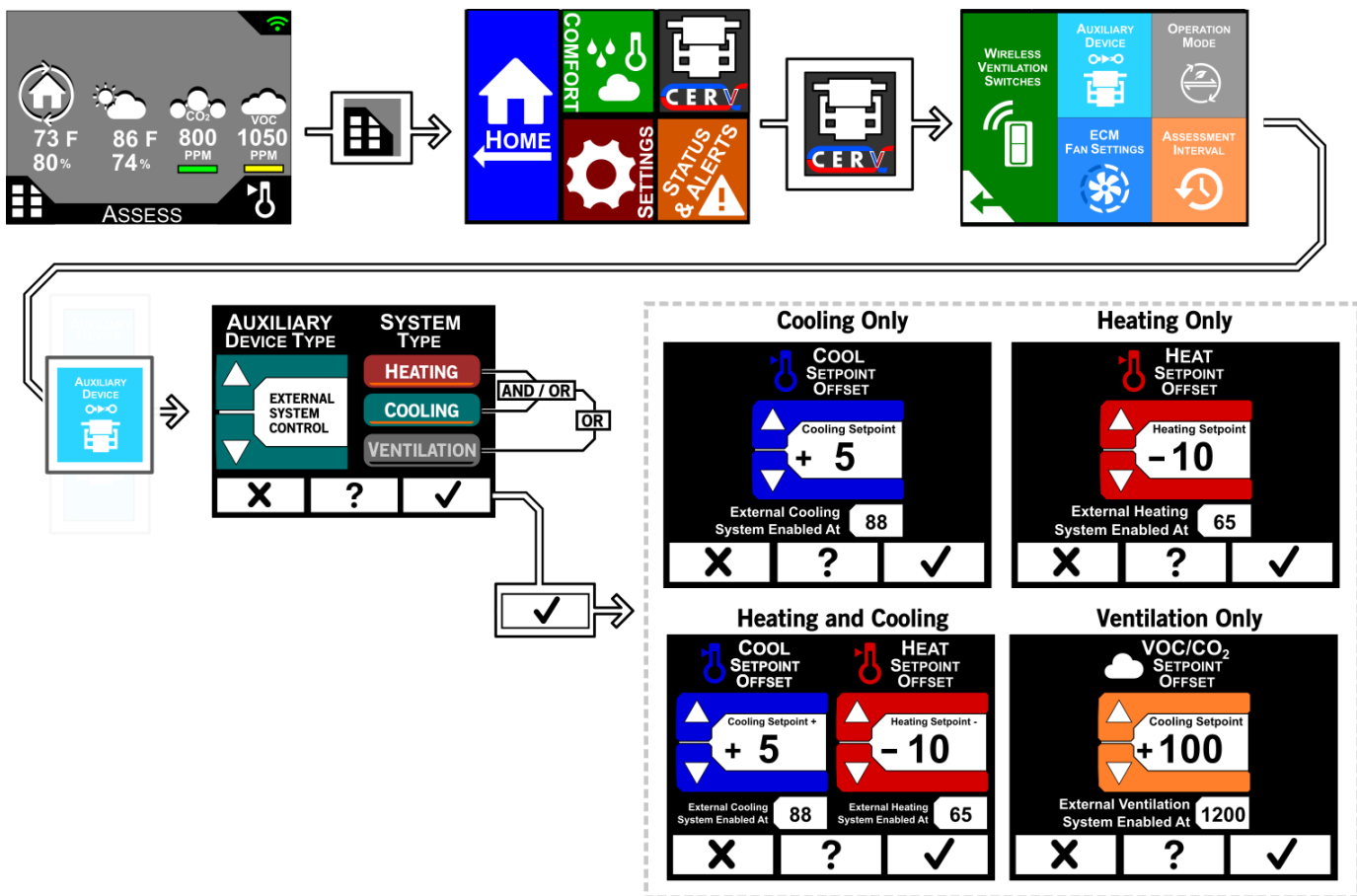
These parameters will generally be configured to the size of the zones being managed. For example, if the first zone is 1000 sq ft, and the second zone is 500 sq ft, it may be reasonable to set the Zone Balance parameter to 60% or 70% (1000/1500). A typical Cycle Length setting may be 1 hour, but this may be changed depending on the occupants comfort. See the Zone damper manual for more information.

Auxiliary Device – External System Control

OVERVIEW:

External System Control can be used in conjunction with a supplemental heating or cooling system, back up electrical duct heater, a supplemental ventilation system to provide fresh air, or other external device. The CERV can control an external device based on a heating, cooling, or ventilation setpoint. Depending on the device to be controlled, one or more of the system types should be selected. Once the system types are selected, and the confirm checkmark button pressed, you will be taken through screens to configure the “Setpoint Offset”.

The Setpoint Offset configures the CERV to enable the selected device relative to the main air quality, heating, or cooling setpoints. An offset of 0 would activate the device using the main CERV setpoints. For example, if your heating setpoint is 75 F, and you have an electric duct heater for backup purposes, you could set the heating setpoint offset to -10 degrees. This would mean that at an inside temperatures above 65 F(75-10), the duct heater would be off, but once the inside temperature dropped below 65 F, the duct heater would be turn on whenever the CERV is heating. The configuration screen shows the setpoint at which the device will be activated relative to your chosen offset and current main setpoint. Changing the main system setpoint will not change the offset; however, the external device setpoint will change accordingly.



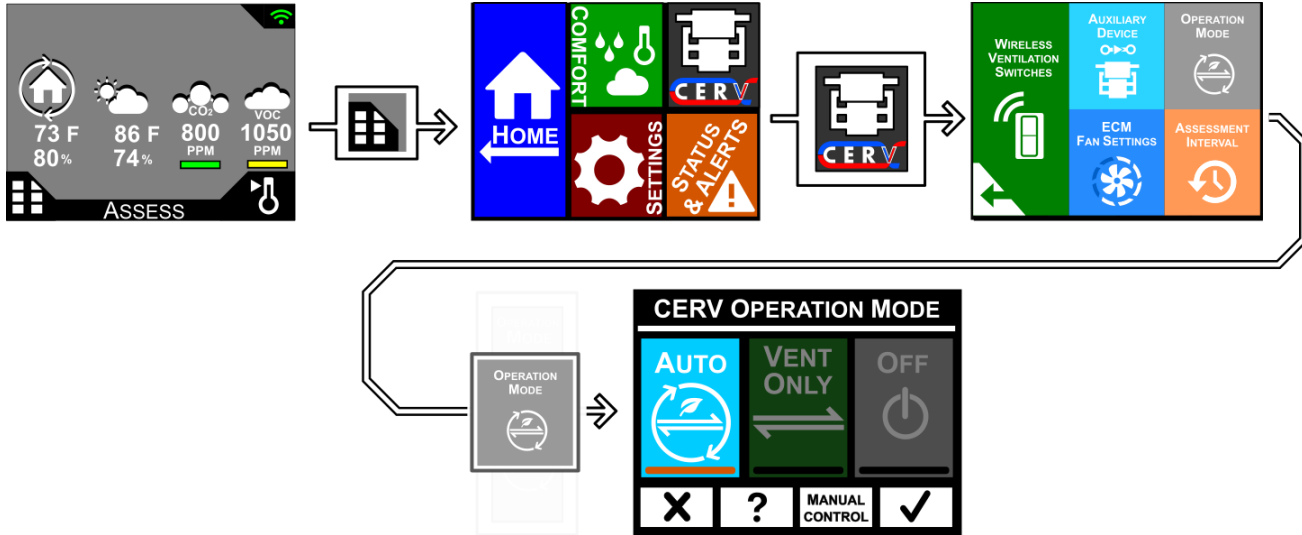
RECOMMENDATIONS:

The offset will depend on the device attached and its intended purpose, whether a supplemental or a back up device.

CERV OPERATION MODE

OVERVIEW:

In most cases, you will want to use Auto Mode letting the CERV use its own internal algorithms to determine its operation based on the setpoints. There may be a scenario in which you want to specify that the CERV may only operate in ventilation mode, or that the system should remain off. You can select the appropriate mode on this screen. Note that selecting Off does not remove power from any portion of the CERV and should not be used in servicing the unit. Electrocution can occur if the proper procedure of disconnecting power to the CERV is not followed.



HELP CERV OPERATION MODE

AUTO

CERV can operate in both recirculation and ventilation modes to fulfill ventilation and temperature requirements. This is the most efficient and effective choice.

HELP CERV OPERATION MODE

VENT ONLY

CERV will attempt to fulfill ventilation requirements, but will not recirc heat/cool due to temperature setpoints. Heating and cooling may still occur during ventilation. Unconditioned recirculation may still be used.

HELP CERV OPERATION MODE

OFF

CERV does not operate. Use when no ventilation or conditioning will be needed (i.e. you are opening windows). This mode should not be used to service unit - system power must be removed.

RECOMMENDATIONS:

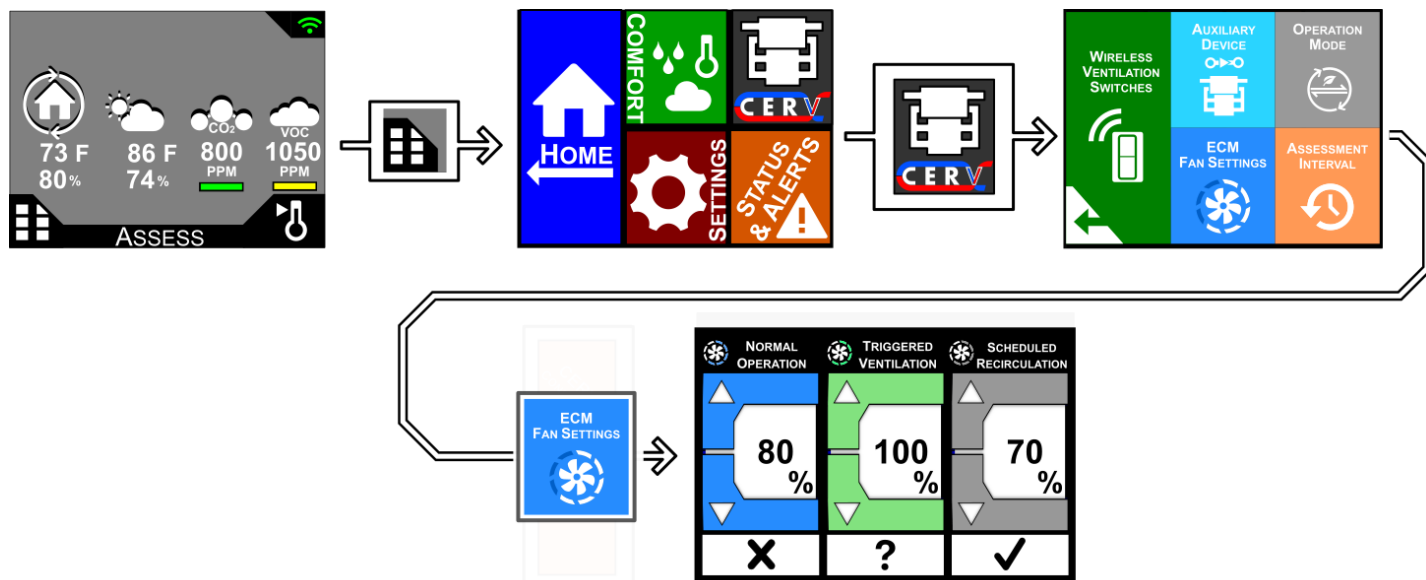
Auto mode is the default operation and is recommended for most efficient operation. Vent mode can be selected if using the CERV for heating and cooling is not wanted. Scheduled recirculation can still be used in this mode. Manual control is only recommended for trouble shooting when a certain mode is needed to check operation.

ECM FAN SETTINGS

OVERVIEW:

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 the Wireless Ventilation Switch package is installed, and 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 (see Triggered Ventilation section above).
- **Scheduled Recirculation:** When no heating, cooling, or ventilation is needed, but the Scheduled Ventilation 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.



HELP	FAN SPEED CONFIGURATION	HELP	FAN SPEED CONFIGURATION	HELP	FAN SPEED CONFIGURATION
	Normal Operation Fan Speed When the CERV is operating normally, this is the desired fan speed. The following two help screens describe the two exemptions - Triggered Ventilation mode and Scheduled Recirculation mode.		Triggered Ventilation Fan Speed When a wireless ventilation switch is pressed, or the Trigger Ventilation option is used, the CERV will immediately ventilate using the specified fan speed. This acts to boost airflow to help purge the home as soon as possible.		Scheduled Recirculation Fan Speed During the Scheduled Recirculation mode (where only the inside fan is active), this setting will determine the speed to recirculate air throughout the home.

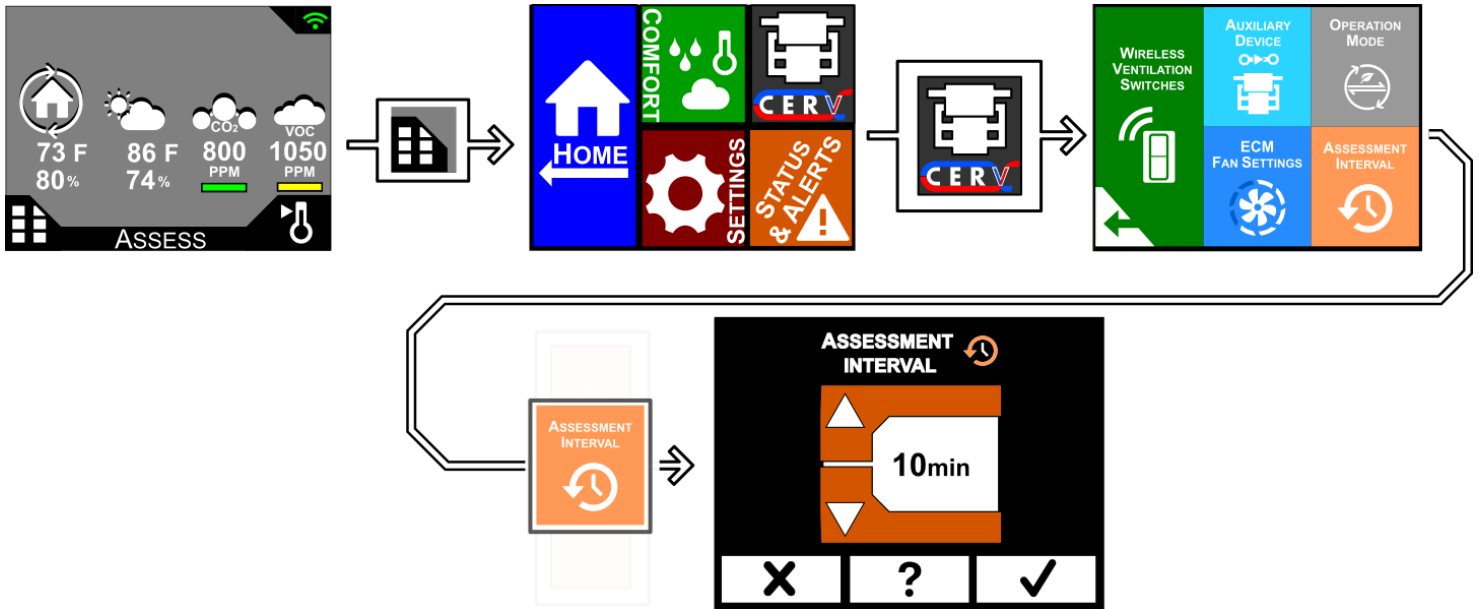
RECOMMENDATIONS:

- **Normal Operation:** This fan setting should be chosen to achieve around 150cfm airflow to the home.
- **Triggered Ventilation:** If you wish to purge the home as quickly as possible, this may be set up to 100%
- **Scheduled Recirculation:** For those with noise sensitivities, a lower airflow for recirculation may be desired. To improve air quality and comfort mixing, a higher airflow could be selected.

CERV ASSESSMENT INTERVAL

OVERVIEW:

When heating, cooling, and ventilation setpoints are all satisfied the CERV will turn off to save energy. By default, the CERV is set to an Assessment Interval of 10 minutes, which means that after 10 minutes of being off, the CERV will perform an assessment to see if any heating, cooling, or ventilation adjustment is needed. During the assessment, only the fans are activated to move air while taking sensor readings. If setpoints remain satisfied the CERV will turn back off for another Assessment Interval period. The Assessment Interval can be increased to prolong the time period between assessments from 10 minutes up to a maximum of 120 minutes. Scheduled Recirculation % discussed on pg 7 is based on this assessment interval.



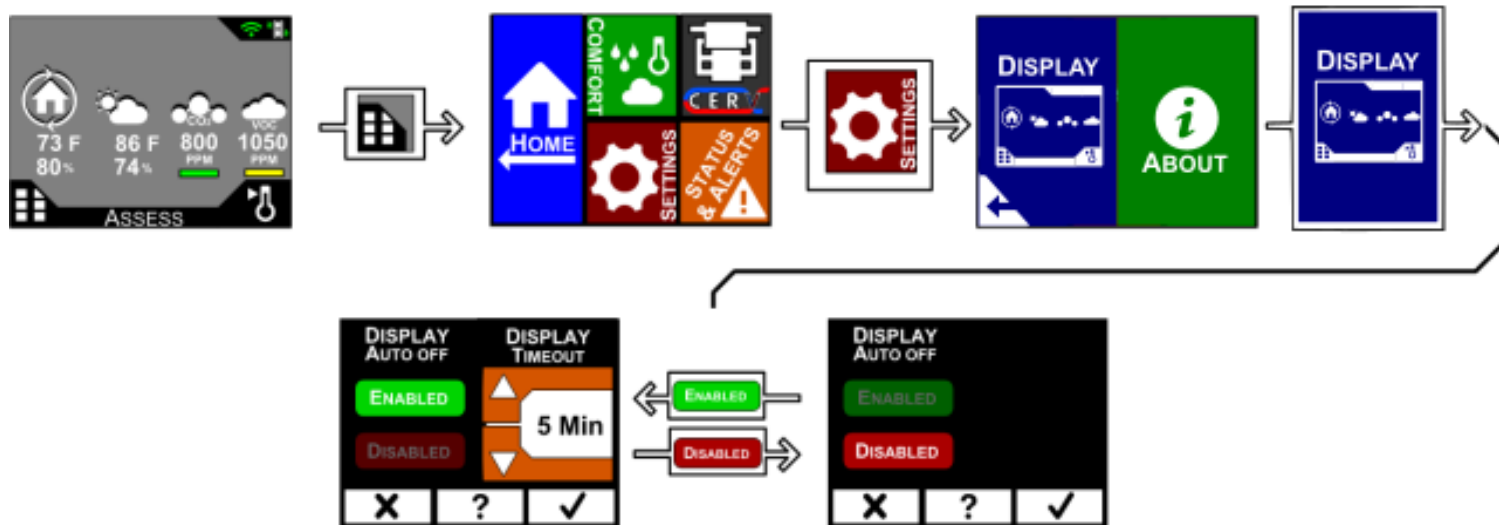
RECOMMENDATIONS:

In general, the shorter the Assessment Interval the more responsive the CERV will be to detecting indoor air quality pollution events. In some cases where noise from fans turning on and off can be detected, increasing the Assessment Interval may be preferred by reducing fan cycling.

DISPLAY SETTINGS

OVERVIEW:

On the Display Settings screen, you can configure the auto-off feature of the screen. If there has been no interaction with the screen after the amount of time specified in Display Timeout, the touchscreen controller will turn off the screen to save power. Simply touch the screen again to turn the display back on. Disabling the auto-off feature will turn the screen on indefinitely.



?

DISPLAY AUTO OFF

ENABLED

After the specified amount of time, the screen will turn off to save power. Simply tapping the screen will turn the display back on.

DISPLAY AUTO OFF

DISABLED

The Screen will stay on indefinitely, even when there has been no activity.


RECOMMENDATIONS:

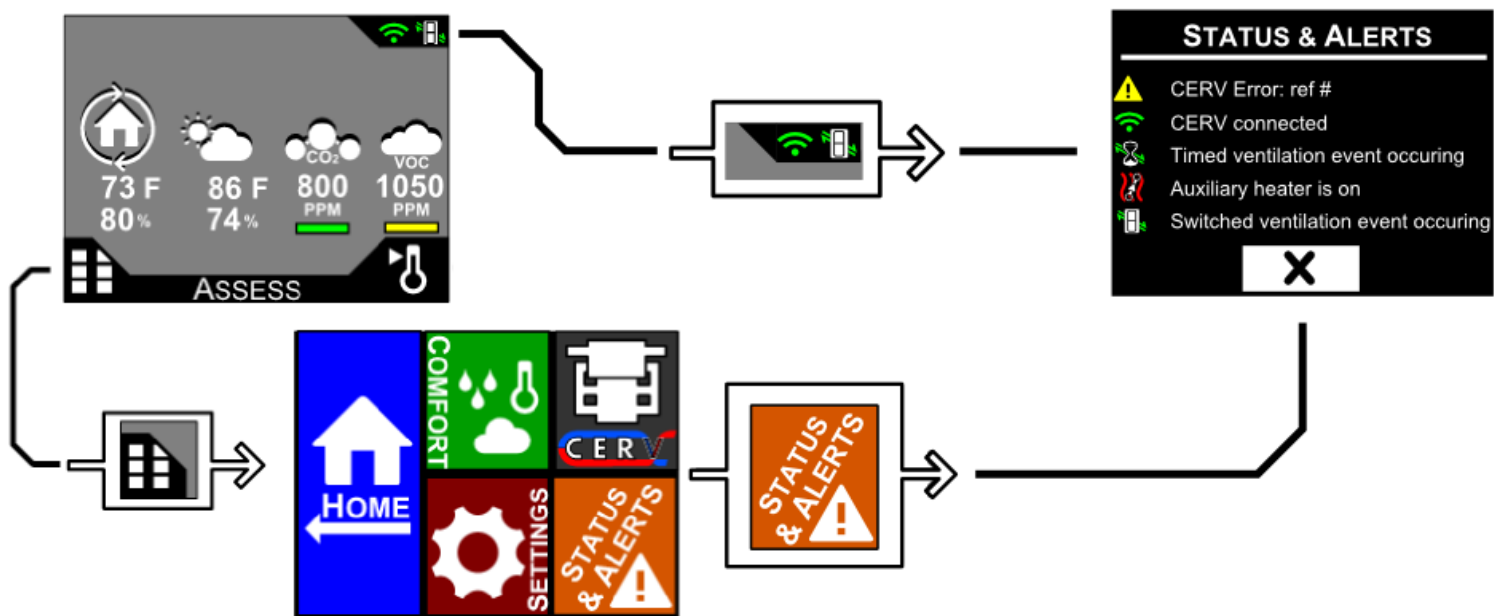
Auto-off saves energy and extends the life of the touch-screen.

STATUS & ALERTS

OVERVIEW:










The Status & Alerts screen provides descriptions of the icons displayed in the Status & Alerts bar on the Home Screen. Clicking on the status bar in the upper right of the Home Screen takes you to the Status & Alerts Screen; likewise you can get there through the Main Menu. There is always a connection icon in the status bar indicating the status of the connection between the CERV and the touchscreen controller. Any additional icons in the status bar indicate different system alerts or events that may be occurring.

If the CERV detects that there is a problem with the system, such as a malfunctioning sensor, an error symbol icon  will appear in the status bar. On the Status & Alerts screen an error reference code or message will be displayed on the line with the yellow warning symbol. See CERV Operation Manual for error code troubleshooting.






List of possible Status and Alerts icons

Status Messages

-  No Connection to CERV
-  CERV connected
-  Timed ventilation event occurring
-  External heating system is on
-  External cooling system is on
-  GEO-Boost is on
-  Zone 1 Active
-  Zone 2 Active
-  Switched ventilation event occurring

Alert Messages

-  **CERV Error: Heat Pump Comm**
The CERV is unable to communicate with the Heat Pump. Please follow the Troubleshooting section in the CERV Operation Manual to resolve this error.
-  **CERV Error: Heat Pump Freq**
The variable speed frequency signal is not being received by the heat pump module. Please follow the Troubleshooting section in the CERV Operation Manual to resolve this error.
-  **CERV Error: ref #**



www.buildequinox.com

1103 N. High Cross Rd.
Urbana, IL 61802

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