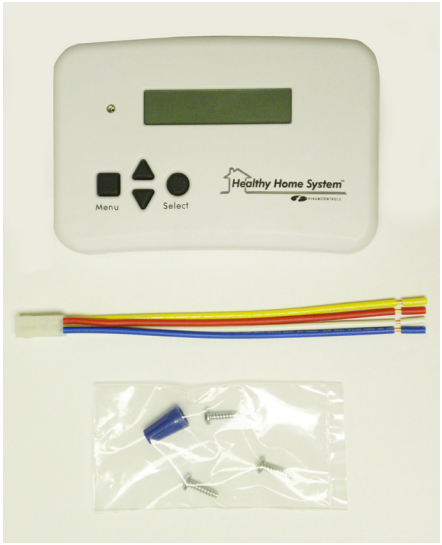
HEALTHY HOME SYSTEM CONTROL Plus

Model: HHSC+



The Field Controls Healthy Home System™ Controller Plus (HHSC+) is designed to work in conjunction with the forced air HVAC system to periodically introduce fresh air into the home by controlling an FAD Fresh Air Damper installed in a fresh air duct connected to the HVAC return plenum, and circulate it throughout the home effectively and efficiently, and enables the HVAC system to meet ASHRAE 62.2 and other ventilation codes and standards.. The HHSC+ is designed to operate continuously year round without user intervention. The HHSC+ is initially programed by the installer and operates interactively with the HVAC system thermostat. Certain features are readily accessible by the occupants for customization of the system, to meet their individual preferences.

ITEMS INCLUDED IN KIT:

- 1-HHSC+ Ventilation and Fan Cycling Control
- 1-Four-wire connector harness for FAD Fresh Air Damper (FAD not included)
- 1-Installation Hardware
- 1-Instruction Booklet

READ THESE INSTRUCTIONS CAREFULLY AND COMPLETELY BEFORE PROCEEDING WITH THE INSTALLATION.

This device MUST be installed by a qualified agency in accordance with the manufacturer's installation instructions. The definition of a qualified agency is: any individual, firm, corporation or company which either in person or through a representative is engaged in, and is responsible for, the installation and operation of HVAC appliances, who is experienced in such work, familiar with all the precautions required, and has complied with all the requirements of the authority having jurisdiction.

Please retain these instructions after installation.

Installed By: _____ Phone: _____ Installation Date: _____

FIELD CONTROLS
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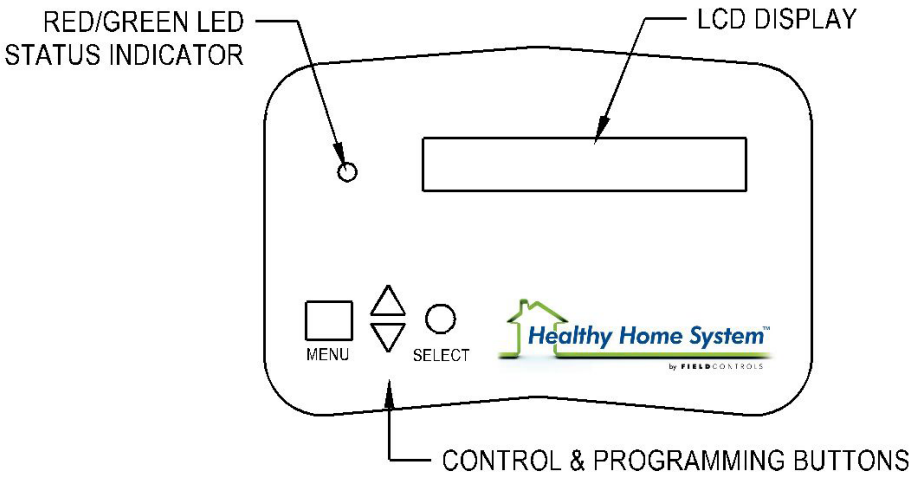
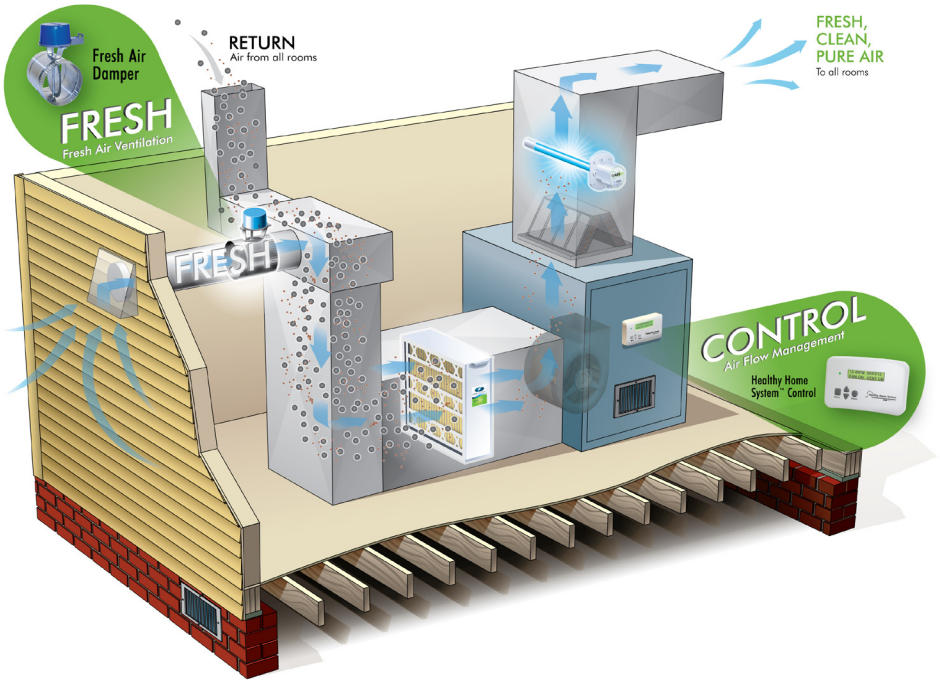


FEATURES

- System Status LED
- User-Programmable Inhibit Mode
- UV lamp replacement reminder
- Air Filter replacement reminder
- Time/Date display
- Automatic Daylight Savings Time correction
- Damper Monitor Feature monitors FAD damper for proper operation
- Remote Activation Terminals: timer, on/off switch, Carbon Monoxide (CO) detector with alarm contacts, makeup air sensor, multiples having dry contacts
- Auxiliary Output terminals (24 VAC): exhaust fan, etc.
- Powered by system transformer, works in conjunction with 24V thermostat or EIM, no additional transformer required
- Compatible with any system having accessible 24V R W Y G terminals



INSTALLATION

CHOOSE FAD FRESH AIR DAMPER LOCATION:

The fresh air damper can be located anywhere in the fresh air inlet duct. Minimize the length of the inlet duct to improve airflow and improve system efficiency. It is recommended that the damper be as close to the return air plenum and the HHSC+ as possible, and that the inlet duct connect to the return plenum upstream of the system filter, and downstream of any duct-mounted sensors.

CHOOSE FRESH AIR INTAKE LOCATION:

ASHRAE recommends that the fresh air intake be located at least 10' from any source of pollutants, such as auto exhaust, dryer exhaust, exhaust from any fuel-burning appliance, etc. Avoid installation near odor sources such as garbage bins or barbecue grills. A minimum of 3' above ground is recommended to avoid ingress of leaf litter, grass clippings, etc. Do not use a crawl space, basement, or attic as a source of intake air. Always be sure to comply with local building code requirements regarding fresh air inlets.

CHOOSE HHSC+ CONTROL LOCATION:

The HHSC+ controller provided with your Fresh Air System can be installed anywhere in your home. Because the HHSC+ does not require routine adjustment it is generally more effective to mount the controller as close to the HVAC system and damper as possible.

⚠ CAUTIONS

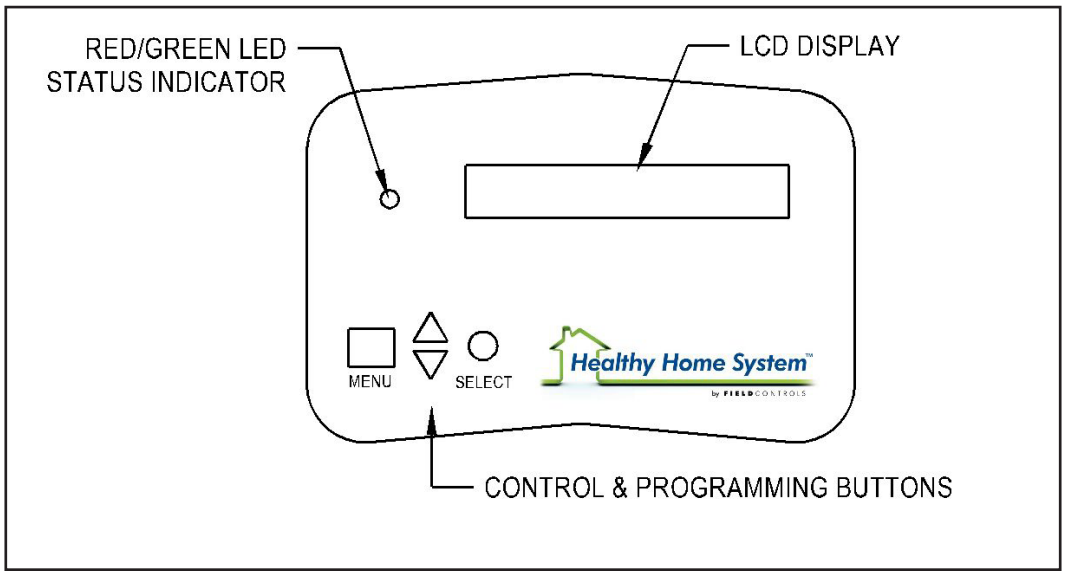
- Before installing the HHSC+, turn off all power to your HVAC system.
- Read and follow all instructions carefully.
- Follow all local electrical codes during installation. All wiring must conform to local and national electrical codes.
- Use caution when mounting components to surfaces that may have concealed wiring beneath the surface.

INSTALLATION (con't)

HOW TO INSTALL DAMPER:

The damper may be installed in any position; although it is recommended to install with the motor at the 3 or 9 o'clock position if mounted horizontally. Air may flow through in either direction, although it is recommended to install with the crimped end as the outlet of the damper. Use care to avoid distorting the damper housing, and provide adequate support.

HOW TO INSTALL THE CONTROLLER:



HHSC+ OVERVIEW

⚠ CAUTION: DISCONNECT POWER TO THE HVAC SYSTEM BEFORE BEGINNING ANY ELECTRICAL CONNECTIONS OR MODIFICATIONS TO EXISTING WIRING.

1. Unsnap the HHSC+ mounting base (back of unit) from the HHSC+.
2. Route wires through large hole in the mounting base. Hold the base against wall and mark wall through 3 mounting holes.
3. Drill 3 - 1/8-in. pilot holes in wall where marked, or holes for drywall anchors if mounting on drywall.
4. Secure mounting base to wall with 3 screws (provided), making sure all wires extend through hole in mounting base.
5. Adjust length and routing of each wire to reach proper terminal and connector block on mounting base with 1/4 in. of extra wire. Strip only 1/8 to 3/16 in. of insulation from each wire to prevent adjacent wires from shorting together when connected.
6. Connect wires to proper terminals of the connector blocks, use appropriate diagram from Typical Wiring Diagrams. Both (R) and (C) must be connected for proper operation. Improper wiring or installation may damage the controller. If using stranded wire, use caution to avoid shorts from stray strands. Check to make sure wiring is correct before proceeding with installation or turning the unit on.
7. Push any excess wire into wall and against mounting base.
8. Snap HHSC+ onto base making sure pins align with sockets in connectors.
9. Once initially powered the HHSC+ will automatically enter into installer programming mode.

TYPICAL WIRING DIAGRAMS

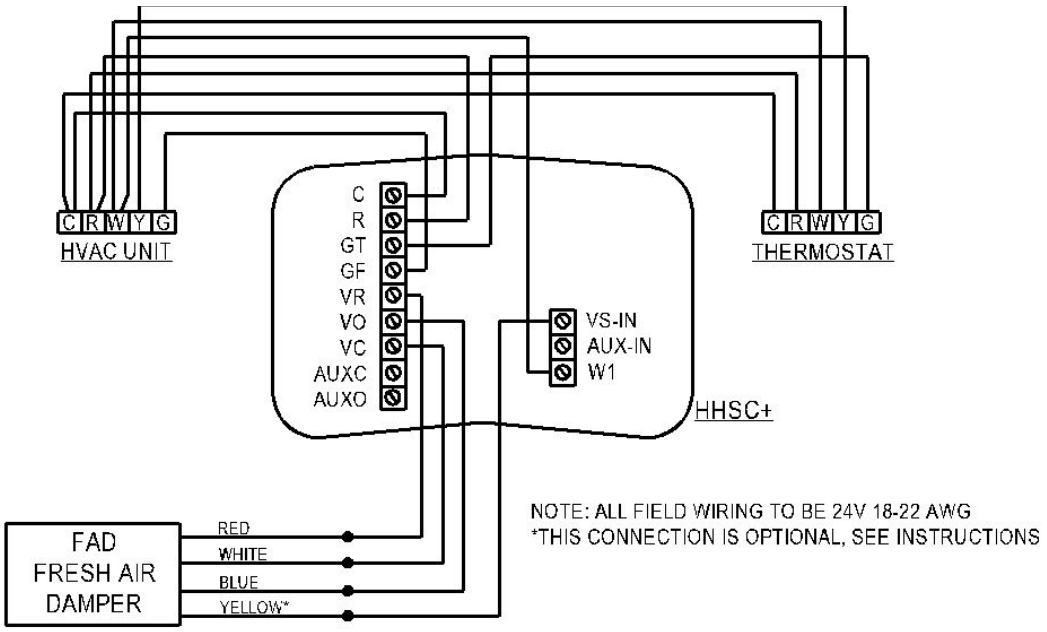


Figure 1 Single-Stage Heating/Cooling

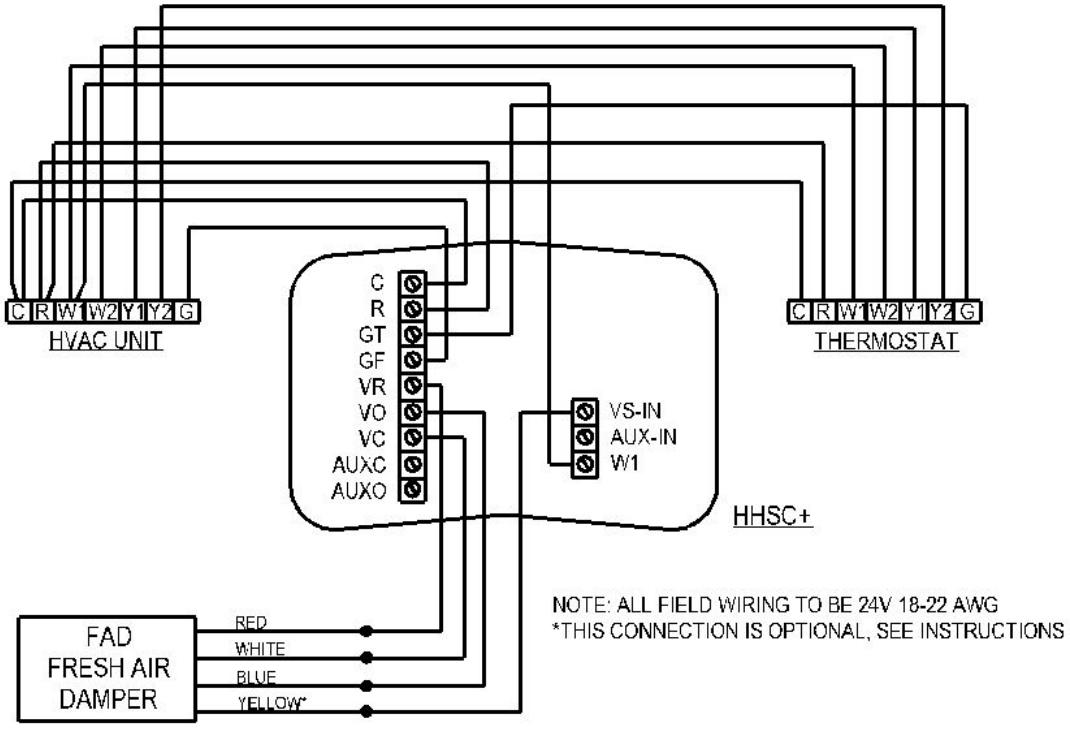


Figure 2 Multi-Stage Heating/Cooling

TYPICAL WIRING DIAGRAMS (con't)

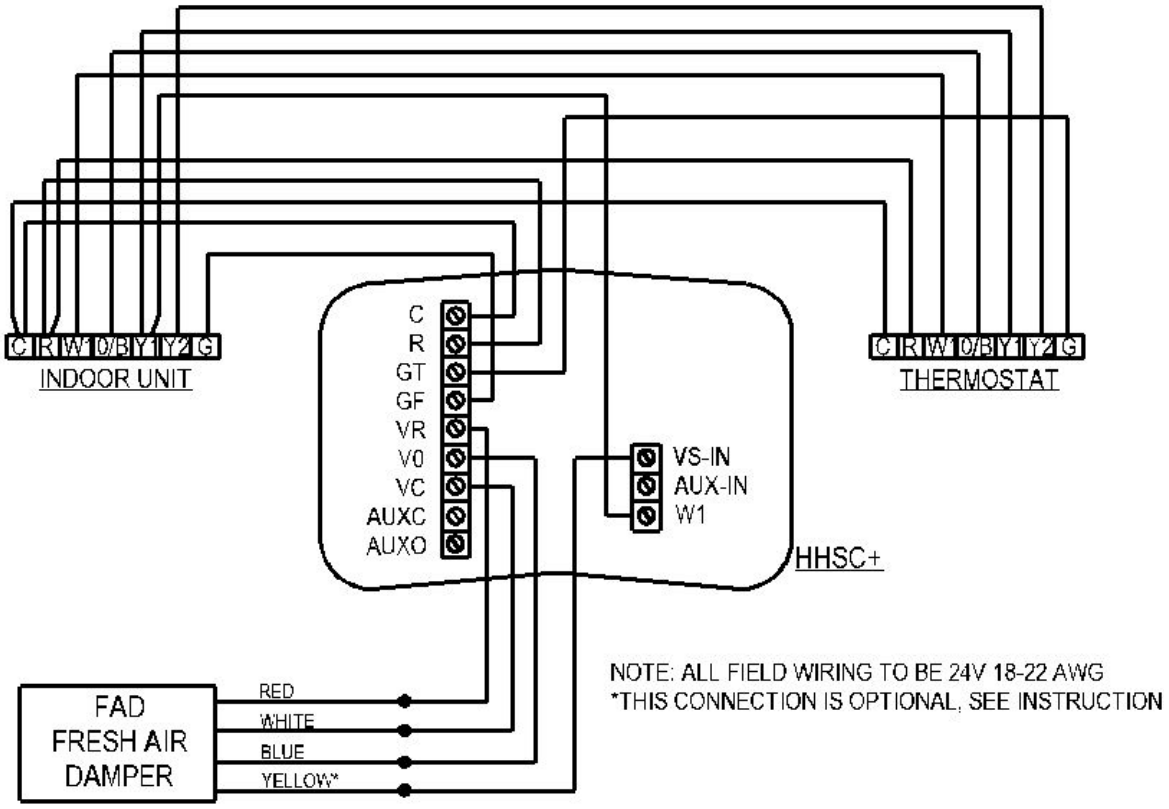


Figure 3 Heat Pump

WIRING TO OPTIONAL EXHAUST FAN AND/OR OPTIONAL REMOTE OVERRIDE DEVICES

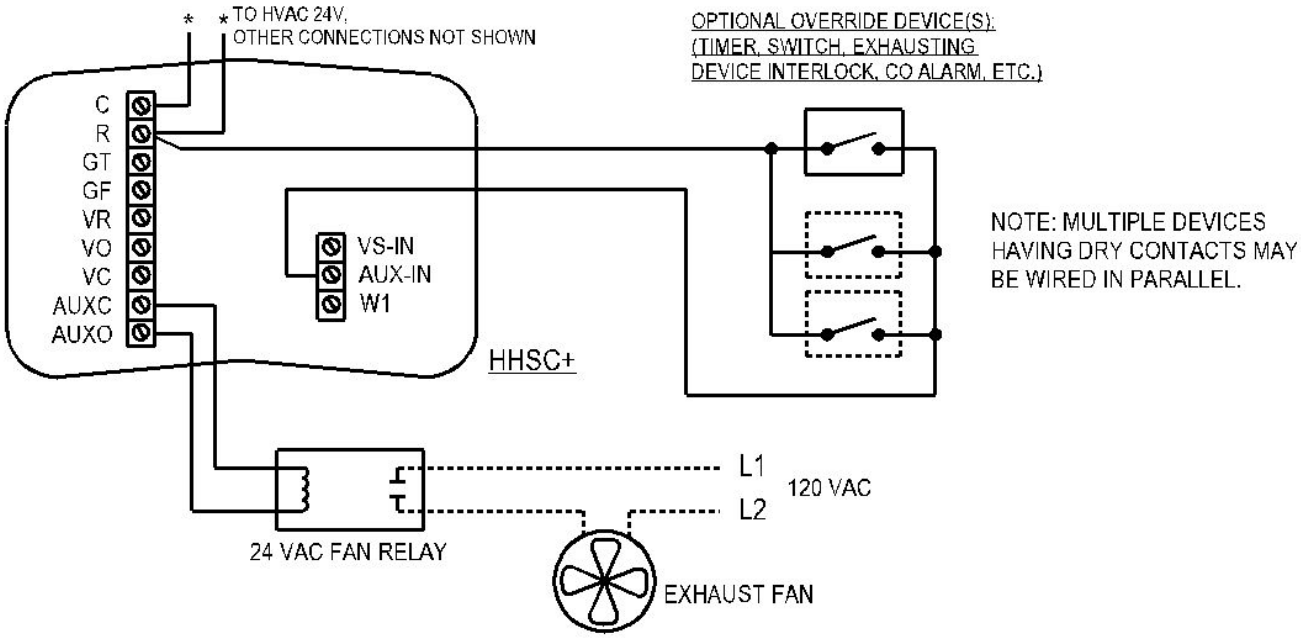


Figure 4 Exhaust Fan & Override Device Control

OPTIONAL EXHAUST FAN CONTROL:

The HHSC+ may optionally control an exhaust fan (not included) using the AUXC and AUXO auxiliary output terminals (wiring to thermostat and HVAC unit not shown for clarity) on the base. Connect the terminals to a 24 VAC relay (not included, 1A max. current) to control a 120 VAC exhaust fan. Whenever ventilation is occurring (the FAD damper is opened), these terminals will be energized and the fan relay will activate the exhaust fan to work in conjunction with the Healthy Home System to provide balanced ventilation. At other times, the exhaust fan may be locally controlled by a wall switch or timer wired in parallel with the relay.

These terminals may also be used as 24 VAC input to control a device having 24 VAC control terminals (max. 1A current).

OPTIONAL REMOTE OVERRIDE CONTROLS:

The HHSC+ may be remotely controlled by optional override device(s); see the Activation by Remote (Override) Device(s) section under Operation.

OPTIONAL OUTDOOR THERMOSTAT AND/OR HUMIDISTAT (not included):

The FAD damper blue wire may be wired in series with an outdoor thermostat and/or humidistat, to prevent ventilation if outdoor conditions are extreme. Note: the Damper Monitor feature must be disabled if this option is installed; see Damper Monitor feature in Setup.

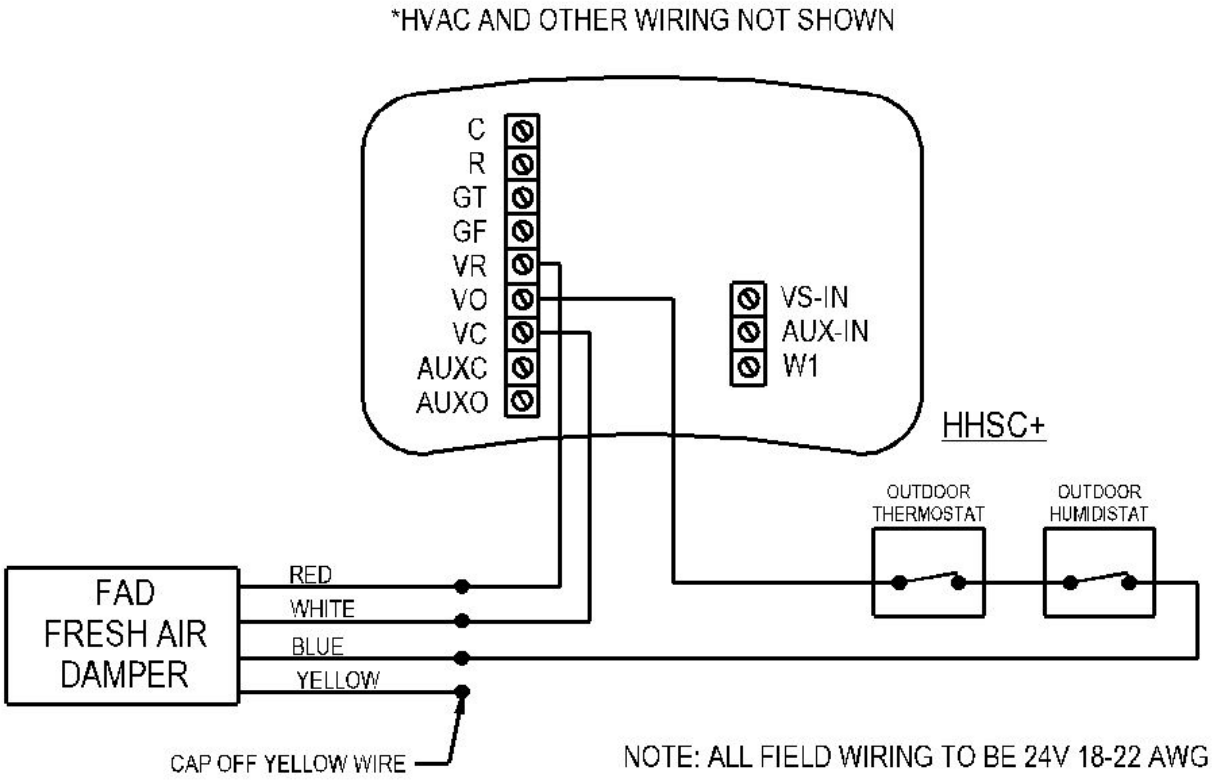


Figure 5 Outdoor Thermostat/Humidistat

SETUP

NAVIGATING THE MENU

Please refer to the color-coded Menu Map for guidance through the HHSC+ menu structure. Each colored box on the Map represents a particular menu item window that will appear on the HHSC+ display. The button colors, shapes, and action arrows in a Map item box correspond to the actions and settings available in the corresponding display menu item window. For instance, if the available selections in a Map item box are colored green, then the HHSC+ selection(s) are adjusted or selected by pressing the button(s) that are colored green in the corresponding Map item box. If an action arrow leads from a box to another box, the button with the corresponding color will cause the action indicated by the arrow.

Pressing "MENU" (square menu button symbol) either scrolls to the next main menu item without entering any settings windows beside a main menu item, or typically exits the settings boxes back to the main menu.

Pressing the up or down arrow buttons (up/down arrow symbols) typically adjust the setting(s) available in that particular menu item window.

Pressing "SELECT" (round select button symbol) typically advances to the next settings window beside a main menu item, or exits from the last settings window back to the main menu.

A main menu item may have settings that are directly adjustable in the main item window, and/or additional settings windows that are available under that main menu item, as accessed by pressing the "SELECT" button.

INSTALLER SETTINGS

The Installer Settings main menu items (orange Map boxes) appear by default upon the first power-up of the HHSC+, and at other times by pressing and holding both "MENU" and "SELECT" buttons at the same time for several seconds. The menu items are:

UV LAMP AND FILTER TIMERS (RED MAP BOXES):

The UV lamp timer will cause the HHSC+ status LED to turn red, and display a message reminding the user to replace UVC germicidal lamp(s) if desired, when the selected replacement period has passed since the timer was reset. Available selections are 1 year, 2 years, and None (if no UVC lamp systems have been installed or if no reminder is desired).

The Filter change timer will cause the HHSC+ status LED to turn red, and display a message reminding the user to replace the HVAC system filter(s) if desired, when the selected replacement period has passed since the timer was reset. Available selections are 3 months, 6 months, 12 months, and None (if no reminder is desired).

VENTILATION SETTINGS (RED MAP BOXES):

The Cycle Period determines how often the HHSC+ will activate the HVAC fan for ventilation and recirculation, if no fan activity is called for by the thermostat before a cycle period has ended. A new cycle will begin every 30, 45, or 60 minutes as selected, or whenever the HVAC fan is de-activated by the system thermostat. If the system fan is manually set to On at the thermostat, the HHSC+ will automatically open the vent damper once every cycle period for the amount of time selected as (Ventilation % ÷100) X Cycle Period. Note: the Cycle Period does not affect the average ventilation rate and may be set to the occupant's preference, without changing the average ventilation rate. The average ventilation rate as may be required to meet ventilation codes is controlled and affected only by the Ventilate % setting.

Ventilate % and Circulate % settings control how long the FAD fresh air vent damper will be open per cycle period, and how long the HVAC circulation fan will be caused to run by the HHSC+ per cycle period. For instance, if Ventilate % is set to 33% (factory default), the FAD damper will open for 33% of the cycle period (example: cycle period is 60 minutes – the FAD will be open for 20 minutes out of 60 minutes, or 0.33 x 60 = 20).

SETTING THE VENTILATION % TO MEET VENTILATION CODES:

EXAMPLE: MEETING ASHRAE 62.2 2010 with given conditions:

- 2000 square foot home (conditioned space) with 3 bedrooms
- 140 cfm of fresh air flow as measured in the fresh air duct while system is operating

		Constant Ventilation Rate (cfm)				
# of Bedrooms		1	2	3	4	5
Home Sq. Ft.	1000	25	32.5	40	47.5	55
	1500	30	37.5	45	52.5	60
	2000	35	42.5	50	57.5	65
	2500	40	47.5	55	62.5	70
	3000	45	52.5	60	67.5	75
	3500	50	57.5	65	72.5	80

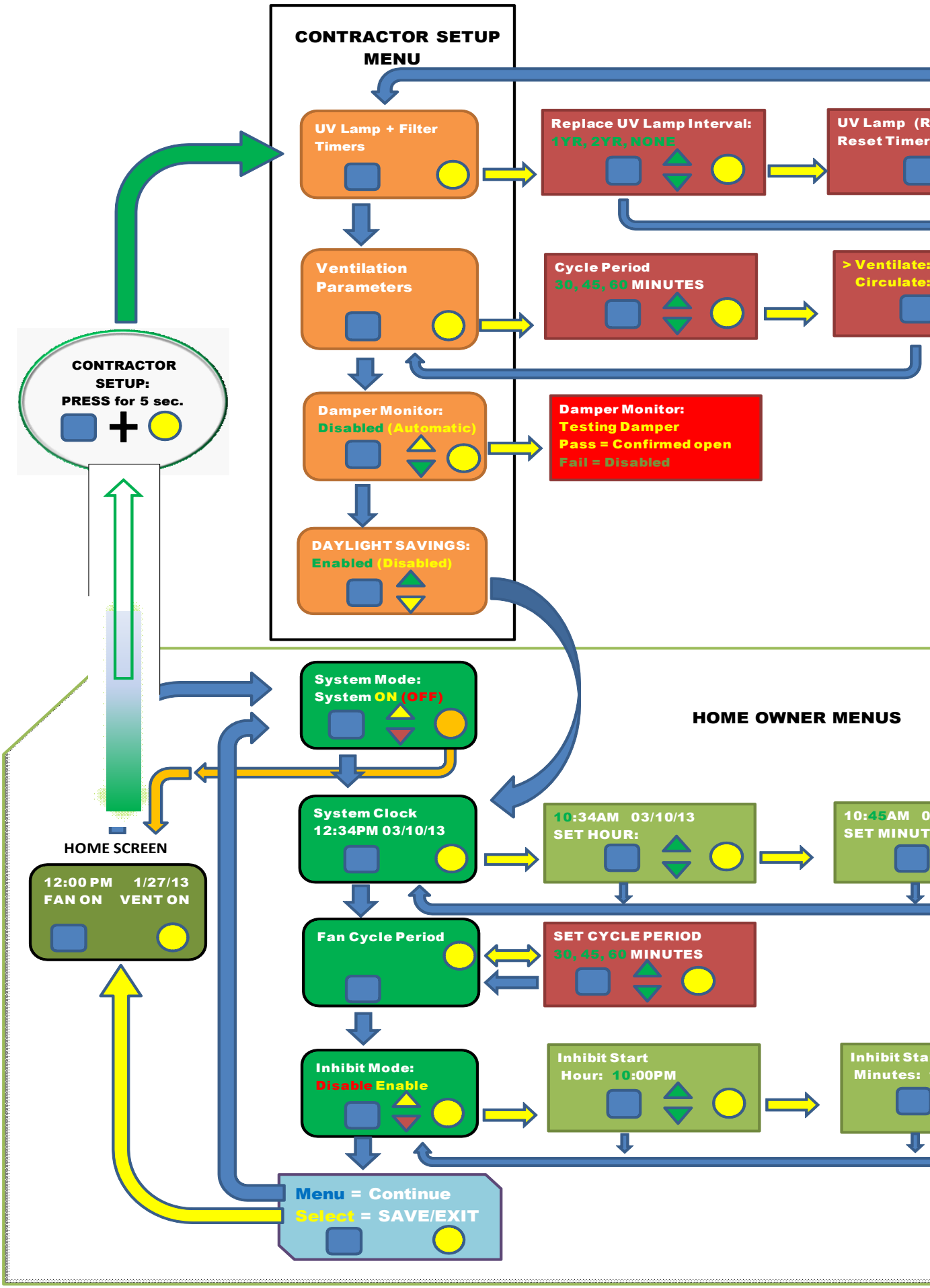
1. Determine the required constant ventilation flow rate from table: 50 cfm.
2. Measure the actual flow rate through the fresh air duct using a flow hood, anemometer, or Pitot tube and manometer, with the HVAC fan running on lowest speed and the FAD damper open (temporarily jumper AUX-IN to R terminal, or activate remote override device if connected): Example: 140 cfm measured.
3. Calculate the Ventilation %: Divide the constant flow rate from the table by the actual fresh air flow rate measured and multiply by 100%:

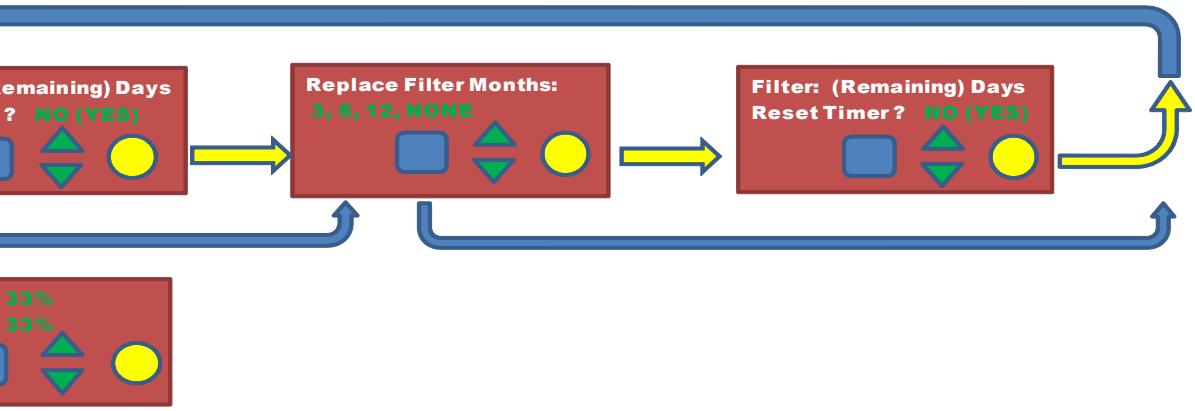
Ventilation % = 50 ÷ 140 x 100% = 36% (rounding up)

For this example, setting the Ventilation % at 36% will ensure ventilation meeting ASHRAE 62.2, regardless of any other settings, as long as the HHSC+ system is set to on, and the inhibit feature is not active. Setting Ventilation % to a higher value will raise the ventilation above the minimum as required by ASHRAE 62.2

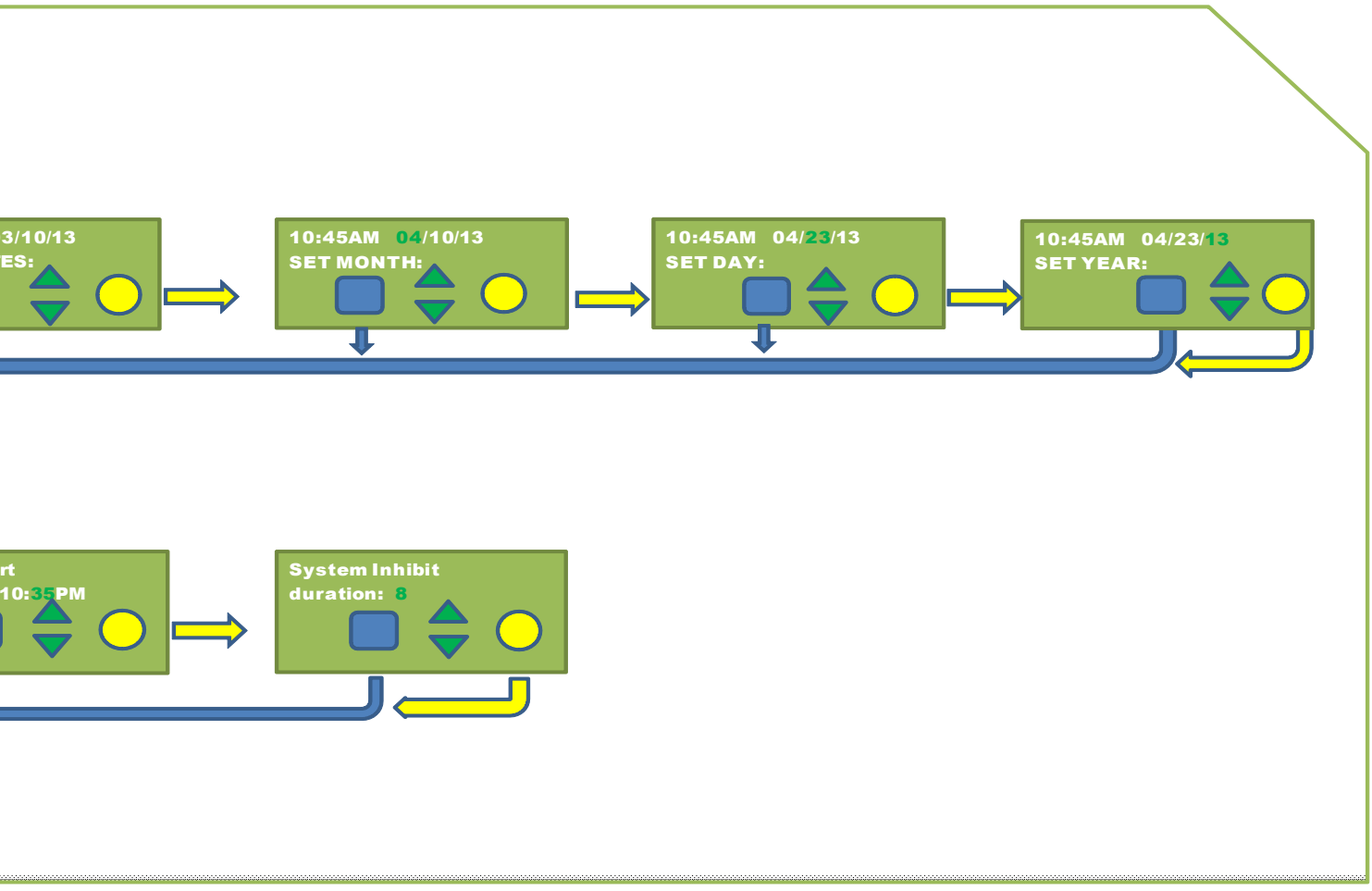
To meet other ventilation codes, substitute the alternately required constant ventilation rate in cfm from step 1 into the calculation in step 3.

If the actual flow rate in the fresh air duct cannot be directly measured, the following table may be used to estimate the Ventilate % setting required for adequate ventilation. Note: using these values will not ensure ventilation meeting any particular code.


CONTRACTOR SETUP MENU
UV Lamp + Filter Timers
Replace UV Lamp Interval:
1YR, 2YR, NONE
UV Lamp (R
Reset Timer
Ventilation Parameters
Cycle Period
30, 45, 60 MINUTES
> Ventilate:
Circulate:
CONTRACTOR SETUP:
PRESS for 5 sec.
Damper Monitor:
Disabled (Automatic)
Damper Monitor:
Testing Damper
Pass = Confirmed open
Fail = Disabled
DAYLIGHT SAVINGS:
Enabled (Disabled)
HOME OWNER MENUS
System Mode:
System ON (OFF)
System Clock
12:34PM 03/10/13
10:34AM 03/10/13
SET HOUR:
10:45AM 0
SET MINUT
HOME SCREEN
12:00 PM 1/27/13
FAN ON VENT ON
Fan Cycle Period
SET CYCLE PERIOD
30, 45, 60 MINUTES
Inhibit Mode:
Disable Enable
Inhibit Start
Hour: 10:00PM
Inhibit Sta
Minutes:
Menu = Continue
Select = SAVE/EXIT


emaining) Days
? NO (YES)
Replace Filter Months:
3, 6, 12, NONE
Filter: (Remaining) Days
Reset Timer ? NO (YES)
33%
33%

MENU MAP


3/10/13
ES:
10:45AM 04/10/13
SET MONTH:
10:45AM 04/23/13
SET DAY:
10:45AM 04/23/13
SET YEAR:
rt
10:35PM
System Inhibit
duration: 8

			VENTILATION % Settings BUILDING SIZE (Ft^2)																	
			1.500			2,000			2,500			3,000			3,500			4,000		
6"DUCT LENGTH			10'	20'	30'	10'	20'	30'	10'	20'	30'	10'	20'	30'	10'	20'	30'	10'	20'	30'
	NO. BEDROOMS	1	27%	28%	30%															
		2	34%	35%	38%	38%	40%	44%												
		3	42%	44%	45%	45%	49%	50	50%	52%	55%	55%	57%	60%	59%	62%	65%			
		4				52%	55%	59	57%	60%	6%4	62%	65%	69%	67%	69%	74%	70%	74%	79%
		5										69%	72%	75%	74%	77%	80%	77%	82%	8%5
		6																84%	89%	94%

Circulate % may be set equal to or greater than the Ventilate %, to cause the HVAC fan to run longer per cycle, for extra circulation, filtration, and UVC treatment if desired, or if the HHSC is used for circulation only. For instance, if Ventilate % is set to 33% and Circulate % is set to 50%, with the cycle period set to 30 minutes, every thirty minutes the HHSC+ will activate the HVAC fan, open the FAD damper for 10 minutes, and continue to run the fan for another 5 minutes (.33 x 30 = 10, .50 x 30 = 15) if the thermostat does not cause the fan to run during the period.

Circulate % may not be set less than Ventilate %, because the HVAC fan must operate when the FAD damper is commanded to be open by the HHSC+. The Circulate % setting will automatically "follow" the Ventilate % setting if it is adjusted higher, but will not "follow" it lower.

DAMPER MONITOR

The HHSC+ can continuously monitor the FAD fresh air damper for proper operation, if the feature is enabled and the yellow wire from the damper pigtail (included) is connected to terminal VS-IN on the HHSC+ (see Figures 1,2, 3). If enabled and the HHSC+ repeatedly detects a malfunction of the damper, the status LED will turn to red, and the display will indicate that a damper malfunction has been detected. NOTE: this feature is optional and may be disabled if desired. If the yellow pigtail wire is not connected to the HHSC+, the HHSC+ will automatically disable the feature.

If this feature is to be enabled, ensure that the FAD damper pigtail's yellow wire is connected to terminal VS-IN, and select "Automatic" in the Damper Monitor menu item window. The HHSC+ will then automatically test the damper and its connection. If the damper responds properly, the display will indicate that the damper is detected and the Damper Monitor feature will be enabled. If the damper does not respond properly or the yellow wire is not connected, the HHSC+ will automatically disable the feature.

This feature may also be disabled manually at any time by selecting the Damper Monitor menu item window and selecting "Disabled", even if the yellow pigtail wire is connected. If an outdoor thermostat or other device is used to prohibit fresh air ventilation when extreme outdoor conditions exist (wired in series between the FAD blue wire and terminal VO, see (Figure 6), the feature must be disabled to prohibit false malfunction detection.

Daylight Savings Time mode: If this feature is enabled, the HHSC+ will automatically adjust its clock time by changing the time by one hour on the specified dates for transitioning to or from Daylight Savings time to Standard time, regardless of the time zone. This feature is important for keeping the Inhibit Mode time schedule correct (see Inhibit Mode feature section), without any changes needed by the user. This feature may be disabled for those areas that do not observe Daylight Savings Time changes.

HOMEOWNER (USER) SETTINGS

The Homeowner Menu items (dark green Map item boxes) are directly available under normal operation, and are accessed simply by pressing the MENU button while at the home screen window, or from the Daylight Savings menu window in the Contractor Setup menu. It is not necessary to press MENU and SELECT to enter the Homeowner Settings menus. The Homeowner Menu items are intended to be the main features of interest by the occupants, while the Contractor Setup Menu items are intended to be accessed only by those installing the HHSC+.

SYSTEM ON/OFF

Setting this parameter to "Off" will terminate all input and output functions of the HHSC+, except for the time/date display, and the status LED will not be lit. The HVAC system will continue to operate normally, with complete control of the system by the thermostat allowed, including manual fan on/auto control at the thermostat. The HHSC+ will continue to be internally powered, in order to maintain the time, date, and UV and filter replacement timers. All HHSC+ settings are retained in "flash" memory; no external or internal battery power is required to maintain the HHSC+ settings. When the HHSC+ System is set back to "On", the HHSC+ will resume all normal functions with all settings as they were before the HHSC+ was turned off.

CLOCK/CALENDAR SET

Press SELECT to set the clock hour (AM and PM), again to set the minutes, and so forth to set the month, day, and year. While it is not necessary for the date to be correct for maintenance of the UV and Filter timers, setting the correct date will result in the automatic Daylight Savings time corrections (if enabled) to occur on the correct dates. This will preserve proper timing of the Inhibit Mode timing (if enabled) throughout the year, automatically.

INHIBIT MODE

This feature allows the occupants to set a daily period in which the HHSC+ will be prohibited from causing the HVAC system fan to run according to the programmed Ventilate, Circulate, and Cycle Period settings, while allowing full control of the HVAC system solely by the thermostat. As a result, the average rates of circulation and fresh air ventilation may be reduced during this period.

While use of this feature may violate some ventilation code requirements, the fresh air rate actually required for adequate ventilation is typically greatly reduced during this time, such as when the occupants are resting or absent and no activity is occurring in the house.

To set and activate the Inhibit Mode, press the SELECT button to enter the programming windows. First set the hour and minute for the time of day/night that the inhibit period is desired to begin. Press SELECT again to set the duration (in hours) of time for which the HHSC+ is desired to be inhibited from activating the HVAC fan. For instance, if the inhibit period is desired to be from 10:30 PM to 6:30 AM, set "Inhibit Start" to 10:30 PM, and "System Inhibit Duration" to 8 hours.

If "System Inhibit Duration" is set to zero (factory default), Inhibit Mode will be automatically disabled.

FAN CYCLE PERIOD

The Fan Cycle Period menu item allows the occupant(s) to select the desired cycle period, or how often the HHSC+ will activate the system by itself, as when the thermostat may be satisfied for long periods. The available selections are 30, 45, and 60 minutes. This feature is also found in the contractor setup menu item as Cycle Period; changing the cycle period in either menu item will have the same effect.

NOTE: Changing the Fan Cycle Period will not affect the average fresh air ventilation rate, which is solely controlled by the Ventilation % setting. It may be freely changed without altering the effective ventilation as required to meet a given ventilation standard.

SAVING THE SETUP

While in the Menu = Continue/Select = Save & Exit window, press SELECT to save the setup settings, exit to the normal operation display window and begin normal operation, or MENU to continue with viewing the available menu items and settings.

If no buttons are pushed for three minutes, any changes to settings will be automatically saved and the HHSC+ will return to normal operation with any changes to settings taking effect immediately.

OPERATION

NORMAL OPERATION DISPLAY AND LED STATUS

Under normal operation, the status LED will glow steady green and the HHSC+ display will show the current time and date on the upper display line. On the lower display line, "FAN ON" will be displayed if the HVAC fan is on (from either thermostat command or HHSC+ program), and "VENT ON" if the FAD vent damper is open.

The status LED will glow steady red, and the display will show an alert message, if action is required for service or maintenance:

- UV lamp replacement: the selected period for replacing UVC germicidal lamp(s) has expired. Replace the lamp(s) and reset the timer by following the instruction on the display.
- HVAC filter replacement: the selected period for replacing the HVAC system filter(s) has expired. Replace the filter(s) and reset the timer by following the instruction on the display.
- Damper Malfunction: the HHSC+ has detected an FAD fresh air damper malfunction (if enabled). Service is required to correct the malfunction; the alert will automatically reset when the malfunction is corrected, or the Damper Monitor feature is disabled.
- The internal backup battery has become weak and is in need of replacement.

INDEPENDENT OPERATION

The HHSC+ will command the HVAC fan to operate periodically for a specific length of time, as governed by the chosen Fan Cycle Period and Circulate % settings, for a length of time (in minutes) equal to

Fan On time = Fan Cycle Period setting (minutes) X Circulate % ÷ 100

Also, the HHSC+ will command the FAD vent damper to open, and the Auxiliary Output terminals will be energized (24 VAC), at the beginning of each fan cycle, for a length of time (in minutes) equal to

Vent On time = Fan Cycle Period setting (minutes) X Ventilate % ÷ 100

If the Damper Monitor feature is enabled, the Auxiliary Output terminals will not energize until the FAD damper opens fully and communicates back to the HHSC+ by energizing the VS-In terminal via the FAD pigtail's yellow wire; otherwise, the Auxiliary Output will be energized immediately. The FAD damper and Auxiliary Output will not be activated for a longer time than the HVAC fan will be commanded to run, but they may be activated for a shorter time.

At the expiration of the Fan On time, the HHSC+ will end the commands to the FAD damper, the HVAC fan, and the Auxiliary Output. The HHSC+ will then remain idle for the remainder of the Fan Cycle Period, when it will begin a new cycle, or the system thermostat calls for action, as described below.

ACTIVATION BY THERMOSTAT

The HHSC+ monitors the activity of the thermostat and performs operations as described here. If the thermostat issues a demand for heating or cooling, or the HVAC fan is manually switched on, before an HHSC Fan On or Fan Cycle Period time expires (see Independent Operation above), the HHSC+ will immediately begin a new Fan Cycle period. The HHSC+ will then command the FAD vent damper to open, and the Auxiliary Output terminals will be appropriately energized, for the Fan On and Vent On times as stated above. The HVAC fan will also be commanded to run by the HHSC+ if either a cooling demand occurs, or if the fan is manually switched on at the thermostat.

NOTE: The HHSC+ will not give a command to run the HVAC fan if a demand for heating only occurs. The HVAC system will operate the fan independently when this occurs. This is also true when there is a demand for cooling, but the HHSC+ merely transmits the fan on command which is issued by the thermostat.

If the thermostat becomes satisfied and terminates the command for heating or cooling, or the fan is manually switched to Off or Auto while there is no current demand for heating or cooling, the HHSC Fan ON and Vent On times will be cut off, and the HHSC+ will terminate the commands to the FAD damper, the HVAC fan, and the Auxiliary Output. The HHSC+ will then remain idle for the remainder of the Fan Cycle Period, when it will begin a new cycle, or the system thermostat calls for new HVAC action.

ACTIVATION BY REMOTE (OVERRIDE) DEVICE(S)

Remote device(s) having dry contacts, such as simple wall switches, timers, CO alarm contacts, pressure switches etc. may be used for remote activation of the HHSC+ ventilation system. Multiple such devices may be connected to the AUX-IN and R terminals in parallel (see Fig. 4); if any of these devices complete an electrical connection between R and AUX-IN, the HHSC+ will activate the HVAC fan, open the FAD damper, and activate the Auxiliary Out terminals, for as long as any of the remote devices are closed.

NOTE: Do not directly connect any devices having solely electronic means of switching electrical current (transistor or triac switching), such as many current sensing relays; electrical leakage through such devices may cause improper operation of the system and may damage the HHSC+ and/or other remote devices. If such a device is to be used, install an isolation relay between the HHSC+ and the device.

POWER OUTAGE

If a power outage occurs, the HHSC+ will resume normal operation after about 15 seconds after power is restored, with all settings as they were prior to the outage, and will display the correct time and date. The display and LED will not show or be illuminated, but the internal backup battery will continue to maintain the time, date, and filter and UV lamp replacement timers; no corrections are required. Battery life is in excess of one year under such conditions.

OPERATION

LED STATUS INDICATOR LIGHT

A steady green light indicates that the Healthy Home System is operating properly. A steady red light indicates action should be taken; one or more messages will be displayed on the display, giving instructions for corrective action(s), such as HVAC filter life expiration, UV lamp life expiration, or a fault having been detected with the FAD damper (if enabled); see Normal Operation Display and LED Status section. The display will also indicate how to reset the LED and display after such an event.

PROBLEM: BLANK DISPLAY ON THE HHC+

SOLUTION CHECK

1. Make sure controller cover is firmly seated in the base; press firmly on the HHSC+ to ensure contact of pins
2. The furnace has power
3. The thermostat is operational
4. The furnace will call for heat from the thermostat
5. The fan operates with a fan only signal from the thermostat
6. Confirm the furnace is providing 24 VAC to the HHSC+
7. Verify wiring conforms to wiring diagrams and connections are dry and tight.

PROBLEM: HHSC+ TURNS FURNACE FAN ON AND OFF, BUT THE MOTORIZED DAMPER DOES NOT CYCLE

SOLUTION CHECK

1. Verify that the mode selector switch on the FAD damper motor is in the “Auto” position
2. Verify that the HHSC+ is providing a 24 VAC signal to the FAD damper
3. Verify that the FAD damper is operational by disconnecting from the HHSC and applying 24VAC to blue and white wires (open), and then red and white (close).
4. Verify continuity in the wiring between the damper and the HHSC+.

PROBLEM: A/C TURNS ON DURING FAN CYCLING CALLS

SOLUTION CHECK

1. Verify wiring conforms to appropriate wiring diagram.
2. Verify the GT and GF wires are properly connected. The G wire normally running between the thermostat and the HVAC equipment needs to be interrupted by the HHSC+. Do not run the G wire in parallel GT and/or GF terminals. The HHSC+ should not back-feed power to the thermostat from the GT terminal by internal energization.

REPLACEMENT PARTS

Pig Tail Harness	P/N 46633900
Internal Battery	Available at local retail outlets (See Battery Specification for replacement information)

SPECIFICATIONS

HHSC+	
Electrical	
Wiring Requirements	18-22 AWG, 24 VAC min
Operating Voltage	20-30 VAC
Maximum Operating Current	1A per input/output circuit, 3A max. Combined
Thermal	
Operating Ambient Temperature Range	32°F to 120°F (0°C to 49°C)
Operating Humidity Range	5 to 90% RH (non-condensing)
Shipping Temperature Range	14°F to 140°F (-10°C to 60°C)

FRESH AIR DAMPER	
Electrical	
Minimum Wiring Requirements	18AWG, 24 VAC
Maximum Voltage	30 VAC
Maximum Operating Current	0.1 Amps
Power Draw Requirement	3W at 24VAC when opening or closing
Timing	15 sec Power OPEN, 15 sec Power CLOSE
Thermal	
Operating Ambient Temperature Range	32°F to 150°F (0°C to 66°C)
Operating Humidity Range	5 to 90% RH (non-condensing)
Shipping Temperature Range	-20°F to 160°F (-29°C to 71°C)

Warranty

For warranty information about this or any Field Controls product, visit:
www.fieldcontrols.com/warranty

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