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Modular Service Tool

Description

The OE391-09 Modular Service Tool is a system operator interface that provides a direct link to enable the system operator to view the status, configure, and adjust the setpoints of any controller on the control system communications loop. The Modular Service Tool is housed in an attractive beige-colored plastic enclosure. The display area is covered with a clear plastic bezel for protection of the display screen. The Modular Service Tool has a 4-line-by-20-character display panel with adjustable contrast control and a 27-key membrane keypad for data selection and entry. All keypad operations are simple and straightforward, utilizing non-cryptic plain English language messages. Menu-driven programming allows for easy setup and operation without the need for specialized training. The Modular Service Tool is supplied with (4) AA 1.5 V batteries, a wall mount DC power supply and a communication cable terminated with an 8-pin DIN connector for connection to the Service Tool. The cable allows you to setup and program any Orion controller with an 8-pin DIN connector socket by simply plugging the service tool into the socket on the controller.

The Modular Service Tool is designed to be hand-carried. Its rugged plastic housing provides superior protection for the electronic components housed inside. The Modular Service Tool is a top-quality service tool that will stand up to the demands of the typical job site environment for many years.

Figure 1: Modular Service Tool Dimensions
Modular Service Tool

Whether you have a Stand Alone, Interconnected, or Networked VCB-X Control System, the Modular Service Tool always connects to an HVAC unit controller via a prefabricated cable that is supplied with the service tool. The Modular Service Tool cable is terminated on both ends with a mini-DIN connector. Attach one end to the Modular Service Tool and the other end to the mini-DIN connector on the HVAC unit controller. If this is an Interconnected System, all controllers that are interconnected with communications cable can be programmed from any HVAC unit controller on the loop. If this is a Networked System, all controllers on the entire Networked System can be programmed from one HVAC unit controller.

Be sure that the Modular Service Tool has fresh batteries installed or that it is connected to a power source using the supplied power pack before attempting any programming of the controller. See Figure 2 for connection details.
Operator Interfaces

In order to configure and program the VCB-X Controller, you must have an Operator’s Interface or a personal computer with the Prism II computer front-end software installed. Two different Operator Interfaces are available for programming of the VCB-X Controls System—the Modular Service Tool and/or the System Manager TS. These devices allow you to access the status and setpoints of any controller on your communications loop. This manual describes the Modular Service Tool only. Please refer to the VCB-X System Manager TS Technical Guide if using the System Manager TS.

The Modular Service Tool allows you to view any temperature or output condition and change any setpoint to fine-tune the operations of the total system. All keypad operations are simple and straightforward, utilizing non-cryptic plain English messages.

Display Screens & Data Entry Keys

See the chart below for a list of the keypad descriptions and functions.

<table>
<thead>
<tr>
<th>Keypad Description</th>
<th>Key Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC</td>
<td>Use this key to exit from screens or from data entry or to return to the Main Menu from any screen in the system.</td>
</tr>
<tr>
<td>ENTER</td>
<td>Use this key to close a data entry field and advance to the next item or screen.</td>
</tr>
<tr>
<td>Clear</td>
<td>If a data entry mistake is made, press this key to clear the data entry field and start over. This key also turns off the power to the Service Tool when on the Main Menu Screen.</td>
</tr>
<tr>
<td>Minus</td>
<td>If a setpoint with a negative value is required, press this key for the minus sign.</td>
</tr>
<tr>
<td>DEC</td>
<td>Press this key when entering data that requires a decimal point.</td>
</tr>
<tr>
<td>← →</td>
<td>Use these keys to step to the next controller on the loop on interconnected or networked systems.</td>
</tr>
<tr>
<td>↑ ↓</td>
<td>Use these keys to step backward or forward through the screens.</td>
</tr>
</tbody>
</table>

Mode Selection Buttons

The Modular Service Tool is provided with “Mode Selection Buttons.” These buttons give you instant access to the specific mode desired without having to scroll through several menu screens to get there.

<table>
<thead>
<tr>
<th>Button Description</th>
<th>Mode Selection Buttons</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
<td>Pressing this button takes you directly to the controller “Status” screens.</td>
</tr>
<tr>
<td>SETPOINTS</td>
<td>Pressing this button takes you directly to the controller “Setpoints” screens.</td>
</tr>
<tr>
<td>SCHEDULES</td>
<td>Pressing this button takes you directly to the controller “Schedules” screens.</td>
</tr>
<tr>
<td>OVERRIDES</td>
<td>Pressing this button takes you directly to the controller “Overrides” screen. See the “Override Button” section on page 14 for a description of this function. See Note 1 below.</td>
</tr>
<tr>
<td>ALARMS</td>
<td>Pressing this button takes you directly to the controller “Alarms” screen. See the “Alarms Button” section on page 13 for a description of this function. See Note 1 below.</td>
</tr>
<tr>
<td>CONFIGURATION</td>
<td>Pressing this button takes you directly to the controller “Configuration” screens.</td>
</tr>
<tr>
<td>BALANCE-TEST</td>
<td>Pressing this button takes you directly to the controller “Balance-Test” screens.</td>
</tr>
</tbody>
</table>

Note:

(1) This button only functions when the system is configured for “Network Mode” or “Multiple MGRS Mode.” It will not function in “Stand Alone Mode.”
**Initialization and Communications**

**Initialization**

**Modular Service Tool Initialization Screen**

After connecting the Service Tool to the controller with the supplied cable, press <ON>. The following screens will appear:

<table>
<thead>
<tr>
<th>Initializing</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS1041 vX.XX</td>
</tr>
<tr>
<td>WattMaster Controls</td>
</tr>
<tr>
<td>Stand-Alone Mode</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Tool vX.XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday Operations</td>
</tr>
<tr>
<td>01/16/12 02:21 PM</td>
</tr>
<tr>
<td>Stand Alone Mode</td>
</tr>
</tbody>
</table>

**Configuring for Network or Stand-Alone Operation**

You must determine if the mode displayed is correct for your system. If it is configured for Stand-Alone, Stand Alone Mode will appear on the bottom line of the display. This is the factory default setting. If you are using this tool on a system or controller that does not have a CommLink or MiniLink PD installed, then this is the correct setting, and you can proceed to the desired screen by pressing the menu key or any function key. If you are using this Service Tool on a communications loop and have installed a MiniLink PD or CommLink, then you need to operate in Network Mode, and the bottom line should display the words, Network Mode.

If your display indicates a different mode than the one you need, press <Enter> and the following screen will appear:

<table>
<thead>
<tr>
<th>1) Set Time &amp; Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2) Communications</td>
</tr>
<tr>
<td>3) Energy Saving</td>
</tr>
<tr>
<td>ESC) Exit Menu</td>
</tr>
</tbody>
</table>

Press <2> to access the Communications Screen.

Enter <0> or <1> to select the proper mode of operation. When you are finished, press <Enter> to return to the Main Menu. The following message will appear on the screen.

You Have Changed The System Mode
Press Any Key To Continue
Setting the Time and Date and Energy Saving Timer

Setting Time & Date
The Modular Service Tool is equipped with a real time clock chip allowing it to maintain the correct time. Once you have programmed the correct time and date, the information is broadcast globally to all controllers on the entire system.

Programming Times
From the Main Menu, press <Enter>. The following screen will appear:

- 1) Set Time & Date
- 2) Communications
- 3) Energy Saving
- ESC) Exit Menu

Press <1> on your keypad to access the Set Time & Date Screens.

Although the times are displayed on the Main Screen in a standard 12-hour format, you must program them using the 24-hour military format. If you configured the VCB-X Controller to use its own Internal Schedules, the Occupied/Unoccupied modes are calculated on the basis of the current real time clock reading.

Programming the Date

<table>
<thead>
<tr>
<th>Program Time/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
</tr>
<tr>
<td>(Sunday=0): X</td>
</tr>
<tr>
<td>Enter Hr. (0-23): XX</td>
</tr>
<tr>
<td>Enter Minutes : XX</td>
</tr>
</tbody>
</table>

Day - Enter the Day of the Week (0 to 6)
Sunday = 0

Hours (Hr) - Enter Hours in 24-Hour Military Format
(1700 = 5:00 PM)

Minutes - Enter the Minutes
(0 to 59)

Setting the Energy Saving Timer
The Modular Service Tool has a built-in timer that can be programmed to shut the Service Tool off after a specified period of time if no buttons are pressed. This is a very useful feature if you are powering the Service Tool from the internal batteries. To access this setting from the Main Status Screen, press <Enter>. The following screen will appear:

Press <3> to access the Energy Saving Screen. The following screen will appear:

Energy Saving
Automatic Power Down
Minutes: xx
Press ESC to Exit

Enter the number of minutes you want the Service Tool to stay active before it automatically powers down. To cancel the automatic power down, enter <99>. After you have entered a number between 1 and 99 minutes, press <ESC> to exit the screen.
Initialization

Scheduling

You can access the VCB-X Controller Scheduling Screens by pressing <Schedule>. Press the number button for the scheduling function you wish to view.

1) Schedule Override
2) Week Schedules
3) Holidays
ESC) Exit Menu

Week Schedules

Event #1

VCBX Schd ID 101
Sunday Event #1
Start Time...: XXXX
Stop Time...: XXXX

Event #2

VCBX Schd ID 101
Sunday Event #2
Start Time...: XXXX
Stop Time...: XXXX

If you are using the internal scheduling capability of the VCB-X Controller, set the schedule hours and holiday periods from the menu shown above. You can also force the unit to operate continuously in occupied or unoccupied mode by selecting the Schedule Override menu item and entering the desired command.

If you are using an external contact closure to signal the occupied mode, you must access the Week Schedule Screens and set all start and stop times to zero to prevent the internal schedule from turning the equipment on when you don’t want it to operate.

The screens will step through the Start Time and then the Stop Time for each day of the week. You can quit at any point in the process by pressing <Escape>. There are two Start/Stop events available per day, so the screen will show which event is being programmed. If you need only one event, keep Event #2’s times set at ZERO.

All times are in 24-hour military format, so 5:00 PM would be entered as 1700.

If both the Start and Stop Times are ZERO, the schedule is in a continuous OFF mode. (Use for Remote Signal Contact.)

If both the Start and Stop Times are 2359, the schedule is in a continuous ON mode.

NOTE: The second line displays which day of the week is currently being programmed. The day of the week automatically increments as you exit the Event #2 screen for the day and continue to the next day’s Event #1 screen.

Caution: The controller ships with all schedules set to zero so that the controller will not attempt to heat or cool before you have configured the system.

Holiday Start/Stop Day Selection

The screens will step through the fourteen possible holidays, one period at a time. Line 2 shows which holiday is currently being programmed. Since a holiday period can encompass more than one day, you need to program the day the holiday starts and the day the holiday ends. If your holiday only lasts one day, simply set both the Start Day and the Stop Day to the same value. Remember to combine the month and day into a single four-digit value.

EXAMPLE: 704 = July 4th (Note: Leading zero not required)
1225 = December 25th

EXAMPLE: 704 = July 4th (Note: Leading zero not required)
1225 = December 25th
The fourteen holidays all use the same Start and Stop times which you program on this screen and the next. You must enter the time in 24-hour military format, the same as a regular week schedule.

Normally, the holidays will operate in an unoccupied mode or a reduced schedule mode. There are two start/stop events available on holidays to match the standard schedule number of events.

Schedule Override

If you want to force the unit to operate in a continuous Occupied or Unoccupied mode, select this menu item to activate the desired method. If a Schedule Override is active, all other methods of schedule control are ignored (Push-Button, Internal, and Remote).

As you can see on the last line of the display, enter <1> to run continuously in the Occupied Mode or <2> to run continuously in the Unoccupied Mode. To restore normal schedule operations, enter <0>.

This override remains in effect until canceled and does not time-out like the Output Overrides do after 10 minutes of no communications.

NOTE: Do not use the Force OFF mode in place of setting all the week schedules to ZERO if you are using a Remote Signal for your scheduling since the Override has priority over the Remote Signal.
Entering the Unit ID (Address)

You must enter the ID (Address) of the controller you wish to program.

With the Main Menu Screen displayed, press the function key associated with the operation (setpoints, configuration, etc.) you want to perform. The screen shown above will appear, asking you to enter a unit ID# (controller address). Put in the ID# of the controller you wish to communicate with and then press <Enter>.

If this is a Network System which has a CommLink and multiple Mini-Link Polling Devices, the Unit ID is actually two separate numbers combined into one value. The first part of the number contains the Loop Address at which the controller is located. The second part of the number contains the actual controller address. See Examples #1 & #2 below.

If this is a Stand Alone System or a single loop system, the Unit ID will be a number between 1 and 59. It is recommended the address be set to 1. See Example #3 below.

**EXAMPLE #1**
You would like to view the 3rd controller on the 5th loop. Enter “503” as the Unit ID.

**EXAMPLE #2**
You would like to view the 12th controller on the 24th loop. Enter “2412” as the Unit ID.

**EXAMPLE #3**
You would like to view the only controller on the loop. Enter “1” as the Unit ID. No loop number is required since there is only one loop.

Press <Enter> after entering the unit ID. If you are using the Modular Service Tool, you will be taken directly to the first screen for the operation you are trying to program.
### Alarm Search

**NOTE:** When you press the `<Alarms>` button on the Modular Service Tool, it will search only the loop number of the unit ID that you have entered; therefore, you must search each local loop individually to access all alarms on the system.

To search for alarms, press `<Alarms>`. The Unit Selection Screen will be displayed. Enter the Unit ID of any controller on the system and press `<Enter>`. Only the alarms on this loop will be searched, not the entire system.

The following screen will appear. The Modular Service Tool will search for any active alarms on the local loop.

![Alarm Screen](image)

After the Modular Service Tool completes its search, it will list the first unit on the local loop whose ID was entered that currently has an active alarm. Press `<Enter>` to scroll through all the alarms for controllers on that particular loop. To move to the next controller or back to the previous unit, use the `<->` or `<<<>` button to move between controllers with alarms on the loop.

![Alarm Search Screen](image)

To clear any alarms that are found, you must fix the problem indicated in the alarm. Once the problem is fixed, the alarm will clear from the screen the next time the unit is polled.

### Override Search

**NOTE:** When you press the `<Overrides>` button on the Modular Service Tool, it will search only the loop number of the unit ID that you have entered; therefore, you must search each local loop individually to access all overrides on the system.

When a space sensor with override option is used with a VCB-X Controller, the Modular Service Tool can determine and report any controllers that are currently operating in an override condition on the local loop whose ID (Address) has been entered before running the search. This function requires that a MiniLink Polling Device is installed on each loop where the controllers may be located.

To access the Overrides Screen, press `<Overrides>` from the Modular Service Tool’s keypad. A screen will appear asking you to enter a unit ID. Enter an ID for any active controller on the local loop you wish to search and press `<Enter>`. Only the overrides on this loop will be searched, not the entire system. The following screen will appear:

![Overrides Screen](image)

After the Service Tool completes its search, it will list the first unit on the selected local loop that is currently in the override mode. Press the previous or next button to scroll through all units on the local loop you have selected that are in the Override Mode.

![Overrides Screen](image)
The available Configuration Screens for the VCB-X Controller are listed on the next few pages by sequential screen number. When each VCB-X Controller is configured for the first time, it is best to start with screen #1 and proceed to each screen in numerical order until you have viewed all available Configuration Screens. This ensures that you have seen all the available VCB-X Controller configuration possibilities and have the opportunity to change or accept the defaults for each screen.

Once the unit is configured and you decide to change one of the screen options, it is helpful to know what screen number contains the configuration you wish to change. With this in mind, the following is a list of all the VCB-X Configuration Screens in numerical order with a brief listing of the configuration feature available on each screen.

<table>
<thead>
<tr>
<th>Screen #</th>
<th>Configuration Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Sensor Scaling (Fahrenheit / Celsius)</td>
</tr>
<tr>
<td>#2</td>
<td>EM1 Expansion Module Installed</td>
</tr>
<tr>
<td>#3</td>
<td>MHGRV-X and MODGAS-X Installed</td>
</tr>
<tr>
<td>#4</td>
<td>12 Relay Expansion Module Installed</td>
</tr>
<tr>
<td>#5</td>
<td>HVAC Source</td>
</tr>
<tr>
<td>#6</td>
<td>SAT Reset Source</td>
</tr>
<tr>
<td>#7</td>
<td>Reset Rate Interval</td>
</tr>
<tr>
<td>#8</td>
<td>Static Pressure Control</td>
</tr>
<tr>
<td>#9</td>
<td>Static/Fan Control Rate</td>
</tr>
<tr>
<td>#10</td>
<td>Fan Voltage Output - Min/Max</td>
</tr>
<tr>
<td>#11</td>
<td>Supply Fan Cycle Mode</td>
</tr>
<tr>
<td>#12</td>
<td>Fan Proving</td>
</tr>
<tr>
<td>#13</td>
<td>Fan Starting Delay</td>
</tr>
<tr>
<td>#14</td>
<td>Purge Mode Delay</td>
</tr>
<tr>
<td>#15</td>
<td>Heat Type</td>
</tr>
<tr>
<td>#16</td>
<td>Modulating Heat Output Signal - Min/Max</td>
</tr>
<tr>
<td>#17</td>
<td>Cool Type</td>
</tr>
<tr>
<td>#18</td>
<td>Digital Compressor For Mod Cool</td>
</tr>
<tr>
<td>#19</td>
<td>Modulating Cooling Output Signal - Min/Max</td>
</tr>
<tr>
<td>#20</td>
<td>Mech Heat/Cool Alarm Delay</td>
</tr>
<tr>
<td>#21</td>
<td>Economizer Control Type</td>
</tr>
<tr>
<td>#22</td>
<td>Economizer in Unoccupied Mode</td>
</tr>
<tr>
<td>#23</td>
<td>Outdoor Air Sensor Installed</td>
</tr>
<tr>
<td>#24</td>
<td>E-BUS Outdoor Air/RH Sensor</td>
</tr>
<tr>
<td>#25</td>
<td>Economizer Enable Source</td>
</tr>
<tr>
<td>#26</td>
<td>Economizer Control Loop Rate</td>
</tr>
<tr>
<td>#27</td>
<td>Economizer Voltage Output - Min/Max</td>
</tr>
<tr>
<td>#28</td>
<td>CO₂ Sensor Installed</td>
</tr>
<tr>
<td>#29</td>
<td>Building Pressure Control</td>
</tr>
<tr>
<td>#30</td>
<td>Building Pressure Control Rate</td>
</tr>
<tr>
<td>#31</td>
<td>Exhaust Fan Output</td>
</tr>
<tr>
<td>#32</td>
<td>Heat Pump Config</td>
</tr>
<tr>
<td>#33</td>
<td>WSHP Glycol Percentage</td>
</tr>
<tr>
<td>#34</td>
<td>Aux Heat Type</td>
</tr>
<tr>
<td>#35</td>
<td>Dehumidification Control</td>
</tr>
<tr>
<td>#36</td>
<td>Suction Pressure Sensor Installed</td>
</tr>
<tr>
<td>#37</td>
<td>E-BUS Space and Humidity Sensor Installed</td>
</tr>
<tr>
<td>#38</td>
<td>Reheat Type</td>
</tr>
<tr>
<td>#39</td>
<td>Defrost Coil Switch</td>
</tr>
<tr>
<td>#40</td>
<td>Head Pressure Control</td>
</tr>
<tr>
<td>#41</td>
<td>Has Water Side Condenser</td>
</tr>
<tr>
<td>#42</td>
<td>Monitor Outdoor Air Airflow</td>
</tr>
<tr>
<td>#43</td>
<td>Control Outdoor Air Airflow</td>
</tr>
<tr>
<td>#44</td>
<td>Outdoor Airflow Duct Size</td>
</tr>
<tr>
<td>#45</td>
<td>Monitor Supply Air Airflow</td>
</tr>
<tr>
<td>#46</td>
<td>Supply Airflow Duct Size</td>
</tr>
<tr>
<td>#47</td>
<td>Monitor Return Air Airflow</td>
</tr>
<tr>
<td>#48</td>
<td>Return Airflow Duct Size</td>
</tr>
<tr>
<td>#49</td>
<td>Monitor Exhaust Airflow</td>
</tr>
<tr>
<td>#50</td>
<td>Exhaust Airflow Duct Size</td>
</tr>
<tr>
<td>#51</td>
<td>Morning Warm Up Value</td>
</tr>
<tr>
<td>#52</td>
<td>AHU Uses Schedule Number</td>
</tr>
<tr>
<td>#53</td>
<td>Daylight Adjustment Start/Stop Date</td>
</tr>
<tr>
<td>#54</td>
<td>Trend Log Rate</td>
</tr>
<tr>
<td>#55</td>
<td>Emergency Shutdown</td>
</tr>
<tr>
<td>#56</td>
<td>Dirty Filter</td>
</tr>
<tr>
<td>#57</td>
<td>Broadcast Outdoor Air Temperature</td>
</tr>
<tr>
<td>#58</td>
<td>Broadcast Outdoor RH</td>
</tr>
<tr>
<td>#59</td>
<td>Broadcast Building Pressure</td>
</tr>
<tr>
<td>#60</td>
<td>Broadcast to Boxes</td>
</tr>
<tr>
<td>#61</td>
<td>Cool Stage Up and Down Delays</td>
</tr>
<tr>
<td>#62</td>
<td>Cool Stage Min Run and Min Off Delays</td>
</tr>
<tr>
<td>#63</td>
<td>Heat Stage Up and Down Delays</td>
</tr>
<tr>
<td>#64</td>
<td>Heat Stage Min Run and Min Off Delays</td>
</tr>
<tr>
<td>#65</td>
<td>Heat Pump Delays - Aux/Emergency Heat</td>
</tr>
<tr>
<td>#66</td>
<td>Heat/Cool Changeover Delay</td>
</tr>
<tr>
<td>#67-70</td>
<td>VCB-X Relay Configuration Screens</td>
</tr>
<tr>
<td>#71-75</td>
<td>EM1 Relay Configuration Screens</td>
</tr>
<tr>
<td>#76-87</td>
<td>12 Relay Configuration Screens</td>
</tr>
</tbody>
</table>
Configuration Screens

In order to correctly set up the VCB-X Controller, you must first configure several parameters in regard to the type of HVAC unit and system you have installed. Most of these values and operating parameters are only set once at the initial system setup and are never changed.

Modular Service Tool Instructions

No matter what screen or menu you’re in, press <Configuration>. The Unit Selection Screen will appear, requesting that you enter the unit ID number. Enter the correct unit ID number of the VCB-X Controller you want to configure and press <Enter>. You will then see Unit Configuration Screen #1.

Configuration Screen #1 - Sensor Scaling

Press <0> for Celsius. If <0> is pressed to make a change to this screen, the last line will display the following: UNIT RESTARTING XX. The screen will display the countdown of 20 and then the last line will display the prompt Press Enter to Cont. Default is Fahrenheit.

Configuration Screen #2 - EM1 Expansion Module Installed

If you have expansion module EM1 installed, this configuration option should be configured as YES. Press <0> to select YES or NO. Default is NO. If your unit utilizes the following, an EM1 Module is required:

- VAV Capabilities
- Building Pressure
- Head Pressure Control
- Return Air Temperature
- Remote Forced Occupied
- Water Source Heat Pump Monitoring
- Modulating Chilled Water
- Water Temperature
- Hood On/Off
- Proof of Flow
- Condenser Control
- Proof of Flow
- Return Air Temperature
- Condenser Control

Configuration Screen #3 - MHGRV-X and MODGAS-X Installed

If you have an MHGRV-X Controller installed, the first configuration option should be configured as YES. Press <0> to select YES or NO. If you have a MODGAS-X Controller installed, the second configuration option should be configured as YES. Press <0> to select YES or NO. Defaults are NO.

Configuration Screen #4 - 12 Relay Expansion Module Installed

If you have a 12 Relay Expansion Module installed, this configuration option should be configured as YES. Press <0> to select YES or NO. Default is NO.
VCB-X Configuration Screens

Configuration Screen #5 - HVAC Source

VCBX Cnfg ID 101
HVAC Source
Space Temperature
Press ‘0’ to Change

This selection will determine which sensor will determine the mode of operation of the unit and how it will operate. Press <0> to change selections. Default is Single Zone VAV. Available options are:

- **Single Zone VAV**—Recirculating unit using the Space Temperature Sensor to determine the mode of operation. Heating and Cooling are controlled to a Leaving Air Setpoint. Space Temperature resets the Supply Fan VFD speed to maintain the Space Temperature. Modulating Heating and Cooling must be used for VAV operation. Can be configured for CAV Heating using staged Heat.

- **Space Temperature**—Typical recirculating unit using a Space Temperature Sensor to determine the Heating, Cooling, and Vent Modes of operation.

- **Outdoor Air**—This is for a 100% Outdoor Air Unit (MUA) using the Outdoor Air Temperature Sensor to determine the Heating, Cooling, and Vent Modes of operation. Dehumidification utilizes an Outdoor Air Dewpoint Setpoint

- **Supply Air**—This is for a standard Cooling Only VAV unit with optional Morning Warm Up. In the Occupied Mode, the unit will be in the Cooling Mode controlling to the Cooling Supply Air Setpoint.

- **Return Air**—Optional recirculating unit configuration using the Return Temperature Sensor to determine the Heating, Cooling, and Vent Modes of operation.

Configuration Screen #6 - SAT Reset Source

VCBX Cnfg ID 101
SAT Reset Source
No Reset
Press ‘0’ to Change

Press <0> to change selections. This configuration option is not available if Single Zone VAV was selected as the HVAC source. The Supply Air Setpoint can be “automatically” adjusted based on a selected reset source. This screen allows you to choose this source. Default is No Reset. The available selections are as follows:

- **No Reset**—No SAT Setpoint Reset will occur. The SAT Setpoints remain fixed.

- **Space Temperature**—The SAT Setpoints will be adjusted based on the Space Temperature.

- **Outdoor Temperature**—The SAT Setpoints will be adjusted based on the Outdoor Air Temperature.

- **Return Air Temperature**—The SAT Setpoints will be adjusted based on the Return Air Temperature.

- **Fan VFD Signal**—The SAT Setpoints will be adjusted based on the VFD Signal. This is good for Adjusting the Setpoints based on the building’s load by looking at the VFD speed.

If the HVAC Source was set Single Zone VAV in Configuration Screen #5, then line 3 on this screen will read No SAT Rst Allowed and the line 4 will be blank.

Configuration Screen #7 - Reset Rate Interval

VCBX Cnfg ID 101
Reset Interval
Rate...: 30 s
[1-255 Seconds]

If you selected a Reset Source in Screen #6, enter a value in seconds between 1-255. This value determines how fast the Supply Air Temperature Setpoint is adjusted as the Reset Source changes. Default is 30 seconds.

Configuration Screen #8 - Static Pressure Control

VCBX Cnfg ID 101
Static Pr Control
None
Press ‘0’ to Change

Press <0> to change selections. This configuration option is available if expansion module EM1 is installed and configured. Default is Fan VFD. The options are:

- **None**—This unit is not controlling Duct Static Pressure.

- **Fan VFD**—This unit has a Supply Fan VFD that modulates to control the Duct Static Pressure or this is a Single Zone VAV application.

- **Bypass Damper**—This unit uses a Bypass Damper to control the Duct Static Pressure.
**Configuration Screen #9 - Static/Fan Control Rate**

![VCB Cnfg ID 101 Static/Fan Control Rate: 10 s]

This value determines the time interval between changes to the Supply Fan Speed or the Bypass Damper Position during duct static pressure control. It also determines the time interval between changes to the Fan Speed during Single Zone VAV Reset of the Supply Fan VFD Speed. Default is 10 seconds.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static/Fan Control Rate</td>
<td>1 sec</td>
<td>10 sec</td>
<td>30 sec</td>
</tr>
</tbody>
</table>

**Configuration Screen #10 - Fan Voltage Output**

![VCB Cnfg ID 101 Fan Voltage Output Min Volts: 0.0 Max Volts: 10.0]

Enter a value between 0.0 and 10.0 VDC for the main fan’s minimum and maximum output voltage. The Fan Speed Status Screen will display 0% to 100%, but the output will range from the minimum value set on this screen to the maximum value set on this screen.

The VCB-X will reverse the logic of the output signal when a Zoning Bypass Damper is used. Defaults are 0 VDC Min and 10 VDC Max.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Fan Voltage</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Maximum Fan Voltage</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**Configuration Screen #11 - Fan Cycle Mode**

![VCB Cnfg ID 101 Fan Cycle Mode NO Press ‘0’ to Change]

Press <0> for YES if you want the HVAC unit’s Supply Fan to only run during Heating or Cooling Mode. If you want the HVAC unit’s Supply Fan to run continuously while in the Occupied Mode, regardless of the Heating or Cooling Mode, press <0> for NO. Default is NO.

**Configuration Screen #12 - Fan Proving**

![VCB Cnfg ID 101 Fan Proving NO Press ‘0’ to Change]

Press <0> for YES if the unit is equipped with a Proof of Flow Switch and it is connected to the VCB-X. If selected as YES and the Proof of Flow Switch is open, only the Supply Fan Relay will be active. If any other relays such as Heating Stages or Cooling Stages are active, they will be deactivated when the Proof of Flow Switch input is lost. Press <0> for NO. Default is NO.

**Configuration Screen #13 - Fan Starting Delay**

![VCB Cnfg ID 101 Fan Starting Delay: -1 s]

Enter the number of seconds you want the fan to delay starting. This is the Supply Fan Starting Delay initiated whenever the VCB-X initiates Supply Fan operation upon going occupied or after power-up. This is useful when you are using multiple VCB-X-controlled HVAC units and want to be sure that all the units do not start at exactly the same time when the Occupied schedule occurs. Each VCB-X should be set with staggered Fan Starting Delay Setpoint values. When the -1 value is used, it multiplies each VCB-X Controller’s address by 5 and uses this value in seconds as the Fan Starting Delay. This provides a staggered start for each VCB-X Controller on the system without having to individually set each VCB-X Controller for its own time delay. Default is -1 second.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Start Delay Timer</td>
<td>-1 Sec</td>
<td>-1 Sec</td>
<td>240 Sec</td>
</tr>
</tbody>
</table>

**Configuration Screen #14 - Purge Mode**

![VCB Cnfg ID 101 Purge Mode Delay: 10 Sec]

Enter the number of seconds you want the unit to stay in Purge Mode before going into Occupied Mode. In Purge Mode, the fan runs with the Economizer at minimum position and all Cooling and Heating is de-energized. Default is 10 seconds.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purge Mode Delay</td>
<td>0 sec</td>
<td>10 sec</td>
<td>900 sec</td>
</tr>
</tbody>
</table>
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Configuration Screen #15 - Heat Type

VCBX Cnfg ID 101
Heat Type
No Heat
Press ‘0’ to Change

Press <0> to change Heat Type selection. Default is No Heat. Available options are:

- **No Heat**—The unit has no Heat.
- **Staged Only**—On/Off Hot Water or fixed stage(s) of Heat.
- **Mod Heat Only**—Only fully modulating forms of Heat which would be Modulating Hot Water or Steam Heat or Modulating SCR Electric Heat. Does not include Modulating Gas using the AAON® MODGAS-X Controller.
- **Mod Heat Then Staged**—Fully modulating Heat as the 1st form of Heat and Stage(s) of Heat as the 2nd form of Heat.
- **Mod Gas Heat Only**—Only Modulating Gas Heat controlled by the AAON® MODGAS-X Controller.
- **Mod Gas Then Staged**—ModGas Heat as the 1st form of Heat and Stage(s) of Heat as the 2nd form of Heat.

See the VCB-X Controller Field Technical Guide for a more detailed description of these operations.

**NOTE:** For Heat Pump Units, use Screen #34 - Auxiliary Heating for configuration.

Configuration Screen #16 - Modulating Heat Output Signal

VCBX Cnfg ID 101
Mod Heat Volt Output
Min Pos Volts:  0.0
Max Pos Volts:  10.0

Enter a value between 0.0 and 10.0 VDC for the Modulating Heat minimum and maximum output voltage. When performing reverse acting heating, the minimum position volts will be the highest value. Defaults are 0 VDC Min and 10 VDC Max.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Position Volts</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Maximum Position Volts</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Configuration Screen #17 - Cool Type

VCBX Cnfg ID 101
Cool Type
No Cooling
Press ‘0’ to Change

Press <0> to change selections. Default is No Cooling. Available options are:

- **No Cooling**—The unit has no Cooling.
- **Staged**—On/Off Chilled Water or fixed stage(s) DX Cooling only.
- **Mod Only**—Modulating Chilled Water or Digital Scroll Compressors.
- **Mod And Staged**—Digital Scroll Compressor(s) as the 1st form of Cooling and fixed stage(s) of Cooling as the 2nd form of Cooling.

Configuration Screen #18 - Digital Compressor For Modulating Cooling

VCBX Cnfg ID 101
Digital Comp For Mod Cool: NO
Press ‘0’ to Change

Press <0> to select YES if your HVAC unit is using a Digital Compressor. If Modulating Cooling is selected on the previous screen, this value will automatically change to YES. Default is NO.

Configuration Screen #19 - Modulating Cooling Output Signal

VCBX Cnfg ID 101
Mod Cool Volt Output
Min Pos Volts:  0.0
Max Pos Volts:  10.0

Enter a value between 0.0 and 10.0 VDC for the Modulating Cooling minimum and maximum output voltage. When performing reverse acting cooling, the minimum position volts will be the highest value. Defaults are 0 VDC Min and 10 VDC Max.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Position Volts</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Maximum Position Volts</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>
### Configuration Screen #20 - Mechanical Heat/Cool Alarm Delay

Enter a time delay between 0-240 minutes for a delay in the time that it takes an alarm to be generated. When Heating or Cooling Mode is initiated and staging is activated, if the Supply Air Temperature does not rise or fall 5°F within this time period, a Mechanical Heating or Cooling failure alarm will be generated. The Alarm is for Status Reporting only. The HVAC unit will continue to run. This alarm does not apply if Modulating Cooling or Heating are configured. Default is 15 Minutes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Heat/Cool Failure Alarm Delay</td>
<td>0 Min</td>
<td>15 Min</td>
<td>240 Min</td>
</tr>
</tbody>
</table>

### Configuration Screen #21 - Economizer Control Type

Press <0> to change selections. Default is No Economizer. Available options are:
- **No Economizer**
- **Standard Economizer**
- **IAQ Economizer (Economizer with CO₂ Override)**

### Configuration Screen #22 - Economizer in Unoccupied Mode

Press <0> to select YES for the Economizer to operate in the Unoccupied Cooling Mode. Default is NO.
- **NO**—You want the Economizer to always remain fully closed in the Unoccupied mode.
- **YES**—You want to use the Economizer as necessary during Unoccupied Night Setback cooling calls. It will be utilized just as it would be in the Occupied mode with the same outdoor enable temperature. If not being used for Night Setback Free Cooling, the Economizer will be closed.

### Configuration Screen #23 - Outdoor Air Sensor

If this unit has any type of an Outdoor Air Sensor installed, this option should be configured as YES. Press <0> to select No. Default is YES.

### Configuration Screen #24 - E-BUS Outdoor Air/RH Sensor

If the Outdoor Air Sensor installed is an E-BUS Outdoor Air Temperature and Humidity Sensor, press <0> to select YES. Default is NO.

### Configuration Screen #25 - Economizer Enable Source

Press <0> to change. This configuration option is available if the unit was configured for Economizer Control. Default is Drybulb. Available options are:
- **Drybulb**—If the Outdoor Air Drybulb temperature is below the Economizer Enable Setpoint, the Economizer can be used as the first stage of cooling.
- **Wetbulb (OA RH Sensor needed)**—If the Outside Air Wetbulb temperature is below the Economizer Enable Setpoint, the Economizer can be used as the first stage of cooling.
- **Dewpoint (OA RH Sensor needed)**—If the Outdoor Air Dewpoint temperature is below the Economizer Enable Setpoint, the Economizer can be used as the first stage of cooling.
### Configuration Screen #26 - Economizer Control Loop Rate

**VCBX Cnfg ID 101**
Economizer Control
Rate: 10 s

*Enter* a number between 0 and 30 seconds. This is the time period between changes to the Economizer position. **Default is 10 seconds.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economizer Control Rate</td>
<td>1 sec</td>
<td>10 sec</td>
<td>30 sec</td>
</tr>
</tbody>
</table>

### Configuration Screen #27 - Economizer Voltage Output

**VCBX Cnfg ID 101**
Econo Voltage Output
Min Volts: 2.0
Max Volts: 10.0

*Enter* a value between 0.0 and 10.0 VDC for the Economizer minimum and maximum output voltage. **Defaults are 2 VDC Min and 10 VDC Max.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Economizer Voltage</td>
<td>0</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Max Economizer Voltage</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

### Configuration Screen #28 - CO₂ Sensor Installed

**VCBX Cnfg ID 101**
Co2 Sensor Installed
NO
Press ‘0’ to Change

*Press* <0> to select YES if you have a CO₂ Sensor installed. **Default is NO.**

### Configuration Screen #29 - Building Pressure Control

**VCBX Cnfg ID 101**
Building Pr. Control
None
Press ‘0’ to Change

*Press* <0> to change. Building Pressure Control is available if expansion module EM1 has been installed and configured. **Default is None.** Available options are:

- **None** — No Building Pressure Control by this controller.
- **On/Off Exh Relay** — If an On/Off Exhaust Fan is being used, select this option and configure a relay output as Exhaust Fan. If the building pressure rises above setpoint, this relay will energize. This is Direct-Acting control.
- **Modulating Exh** — If the building pressure rises above setpoint, a modulating signal will be used to control an exhaust fan VFD or a modulating damper to maintain setpoint. A relay configured as Exhaust Fan can be used to enable this device so that the modulating signal can control it. This is Direct Acting control.
- **OA Damper** — Select if reverse acting Building Pressure Control using the Outdoor Air Damper is required. If the building pressure falls below setpoint, the OA Damper (Economizer) signal will be used to modulate the OA Damper to maintain setpoint. This is Reverse Acting control.
- **Supply Fan** — Contact WattMaster Factory regarding this reverse acting Building Control option. This should not be used in most applications. This is Reverse Acting control.

### Configuration Screen #30 - Building Pressure Control Rate

**VCBX Cnfg ID 101**
Building Pr. Control
Rate: 10 Sec
Press ‘0’ to Change

*Default is 10 seconds. Press* <0> to change. The Building Pressure Control Rate is the time period between changes to the Building Pressure Control signal.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Pressure Control Rate</td>
<td>1 sec</td>
<td>10 sec</td>
<td>30 sec</td>
</tr>
</tbody>
</table>
This configuration option is available if expansion module EM1 has been installed and configured and if Modulating Building Pressure Control was configured on a previous screen. The following will set the output voltage range for both Direct and Reverse Acting Building Pressure control. **Defaults are 0 VDC Min Volts and 10 VDC Max Volts.** Available options are:

- **Min Volts**—Voltage at which the signal to exhaust fan, exhaust damper, or OA damper will be at 0% for either Direct or Reverse Acting Building Pressure control.
- **Max Volts**—Voltage at which the signal to exhaust fan, exhaust damper, or OA damper will be at 100% for either Direct or Reverse Acting Building Pressure control.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Position Volts</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Maximum Position Volts</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

If this is a Water Source Heat Pump Unit, this screen allows you to configure the percentage of glycol in your unit. Options are 0% to 40% in 5% increments. **Press <0> to change selections. Default is 0%.**

If this is a Heat Pump, choose the appropriate Aux Heat option. **Press <0> to change selections. Default is No Aux Heat.** Available options are:

- **No Aux Heat**—This unit does not have Heat Pump Auxiliary Heat.
- **Staged Only**—This unit has a stage(s) of Auxiliary Heat. Multiple relays can be configured as Aux Heat in which case the relays will stage up as required.
- **Modulating Only**—This unit has a form of modulating heat being used as Auxiliary Heat. ModGas cannot be used as the modulating heat source.
- **Mod Then Staged**—This unit has modulating heat that will be used as the 1st form of Auxiliary Heat followed by a stage(s) of Aux Heat.
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Configuration Screen #35 - Dehumidification Control

VCBX Cnfg ID 101
Dehum. Control: None
Press '0' to Change

If using Dehumidification choose the appropriate Dehumidification option. Press <0> to change selections. Default is None. Available options are:

- **None** — The unit does not have a Dehumidification Mode.
- **Only Occupied Vent** — The unit can only enter Dehumidification during the Occupied Vent Mode (when there is no call for Cooling or Heating).
- **Only Vent Anytime** — The unit can only enter Dehumidification during the Vent Mode (when there is no call for Cooling or Heating) in both the Occupied and Unoccupied operation.
- **All Modes Occupied** — This is Occupied Mode Dehumidification Priority. The unit can enter Dehumidification during Cooling, Heating, or Vent Modes, but only while in Occupied operation.
- **All Modes Anytime** — This is Occupied and Unoccupied Dehumidification Priority. The unit can enter Dehumidification during Cooling, Heating, or Vent Modes while in Occupied or Unoccupied operation.

For units controlled by space humidity sensors, Dehumidification is initiated based on an Indoor Humidity Setpoint. For 100% OA units (MUA), Occupied Dehumidification is initiated based on an Outdoor Air Dewpoint Setpoint. For MUA units, Unoccupied Dehumidification can only occur if the unit is configured for Night Setback recirculating operation and has a Space Humidity sensor and a Space Humidity Setpoint.

Configuration Screen #36 - Suction Pressure Sensor Installed

VCBX Cnfg ID 101
Suction Pr Sensor Installed: NO
Press '0' to Change

Press <0> to select YES if you have a Suction Pressure Sensor Installed. Default is NO.

Configuration Screen #37 - E-BUS Space and Humidity Sensor Installed

VCBX Cnfg ID 101
E-BUS SPC/RH Sensor: NO
Press '0' to Change

Press <0> to select YES if you have an E-BUS Space and Humidity Sensor Installed. Default is NO.

Configuration Screen #38 - Reheat Type

VCBX Cnfg ID 101
Reheat Control None
Press '0' to Change

This configuration option is available if expansion module EM1 has been installed and configured and if Dehumidification has been configured. If you need Reheat in the Dehumidification mode, this screen allows you to configure what kind of reheat will be used.

The output(s) will be staged or modulated to maintain the Active Supply Air Setpoint. Default is None. Press <0> to select the type of reheat that will be used during dehumidification.

- **None** — No reheat.
- **On/Off HGR Relay** — Single On/Off Reheat stage (Reheat Relay).
- **Mod HGR** — Modulating Hot Gas Reheat (MHGR)
- **Unit Heat** — Using the unit’s heat as Reheat when Hot Gas Reheat is not available.
- **Mod HGR then Unit Heat** — Using MHGR as the 1st form of Reheat, supplemented by unit Heat if necessary.
- **On/Off HGR then Unit Heat** — Using “Reheat Relay” stage as the 1st form of Reheat, supplemented by unit Heat if necessary.

Configuration Screen #39 - Defrost Coil Switch

VCBX Cnfg ID 101
Defrost Coil Switch NO
Press '0' to Change

Press <0> for YES if a Defrost Coil Temperature Switch is installed and is connected to the Defrost Coil Temperature Switch binary input. If this switch closes, it will initiate a Defrost Mode. Default is NO.
**Configuration Screen #40 - Head Pressure Control**

VCBX Cnfg ID 101
Head Pr. Control: NO
Press ‘0’ to Change

This configuration option is available if expansion module EM1 has been installed and configured and if Head Pressure Control is required. Press <0> for YES. Default is NO.

**Configuration Screen #41 - Has Water Side Condenser**

VCBX Cnfg ID 101
Has Water Side Cond. NO
Press ‘0’ to Change

This configuration option is available if expansion module EM1 has been installed and configured and if using a Water Side Condenser. Press <0> for YES. Default is NO.

**Configuration Screen #42 - Monitor Outdoor Air Airflow**

VCBX Cnfg ID 101
Monitor OA Airflow NO
Press ‘0’ to Change

Press <0> for YES if you have an Airflow Monitoring station measuring the CFM of the Supply Air airflow stream of this unit. Default is NO.

**Configuration Screen #43 - Control Outdoor Air CFM**

VCBX Cnfg ID 101
Control Outdoor Air CFM: NO
Press ‘0’ to Change

Press <0> for YES if you have an Airflow Monitoring station and are controlling the Outdoor Air Damper to an airflow (CFM) Setpoint. Default is NO.

**Configuration Screen #44 - Outdoor Airflow Duct Size**

VCBX Cnfg ID 101
Outdoor Airflow Duct Size: 000.00 [In Square Feet]

For the controller to properly calculate the Outdoor Air CFM, you need to enter the area in square feet of the Outdoor Air duct/damper. When measuring the Outdoor Air duct damper area, be sure to measure the inside dimensions of the damper. The duct size needs to be accurate to two decimal places. The more accurate the measurements, the more accurate the CFM reading will be. Default is 0.

**Configuration Screen #45 - Monitor Supply Air Airflow**

VCBX Cnfg ID 101
Monitor SA Airflow NO
Press ‘0’ to Change

Press <0> for YES if you have an Airflow Monitoring station measuring the CFM of the Supply Air airflow stream of this unit. Default is NO.

**Configuration Screen #46 - Supply Airflow Duct Size**

VCBX Cnfg ID 101
Supply Airflow Duct Size: 000.00 [In Square Feet]

For the controller to properly calculate the Supply Air CFM, you need to enter the area in square feet of the Supply Air duct/damper. When measuring the Supply Air duct damper area, be sure to measure the inside dimensions of the damper. The duct size needs to be accurate to two decimal places. The more accurate the measurements, the more accurate the CFM reading will be. Default is 0.

**Description Minimum Default Maximum**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor Airflow Duct Size</td>
<td>0</td>
<td>0</td>
<td>200.00</td>
</tr>
<tr>
<td>Supply Airflow Duct Size</td>
<td>0</td>
<td>0</td>
<td>200.00</td>
</tr>
</tbody>
</table>
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Configuration Screen #47 - Monitor Return Air Airflow

VCBX Cnfg ID 102
Monitor RA Airflow
NO
Press ‘0’ to Change

Press <0> for YES if you have an Airflow Monitoring station measuring the CFM of the Return Air airflow stream of this unit. Default is NO.

Configuration Screen #48 - Return Airflow Duct Size

VCBX Cnfg ID 101
Return Airflow Duct Size: 000.00
[In Square Feet]

For the controller to properly calculate the Return Air CFM, you need to enter the area in square feet of the Return Air duct/damper. When measuring the Return Air duct damper area, be sure to measure the inside dimensions of the damper. The duct size needs to be accurate to two decimal places. The more accurate the measurements, the more accurate the CFM reading will be. Default is 0.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Airflow Duct Size</td>
<td>0</td>
<td>0</td>
<td>200.00</td>
</tr>
</tbody>
</table>

Configuration Screen #49 - Monitor Exhaust Airflow

VCBX Cnfg ID 101
Monitor Exh Airflow
NO
Press ‘0’ to Change

Press <0> for YES if you have an Airflow Monitoring station measuring the CFM of the Exhaust Air airflow stream of this unit. Default is NO.

Configuration Screen #50 - Exhaust Airflow Duct Size

VCBX Cnfg ID 101
Exhaust Airflow Duct Size: 000.00
[In Square Feet]

For the controller to properly calculate the Exhaust Air CFM, you need to enter the inside area in square feet of the Exhaust Air duct/damper. When measuring the Exhaust Air damper area, be sure to measure the inside dimensions of the damper. The duct size needs to be accurate to two decimal places. The more accurate the measurements, the more accurate the CFM reading will be. Default is 0.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust Airflow Duct Size</td>
<td>0</td>
<td>0</td>
<td>200.00</td>
</tr>
</tbody>
</table>

Configuration Screen #51 - Morning Warm Up

VCBX Cnfg ID 101
Morning Warm Up
None
Press ‘0’ to Change

You can choose between the following Morning Warm Up options. Press <0> to change selections. Default is None. Available options are:

- **None**—There is no Morning Warm Up required.
- **Stand Alone**—The VCB-X Controller is not communicating to Orion VAV Box controls, but a Morning Warm Up Relay can be configured to signal boxes by other to open.
- **Bcast Fixed to Boxes**—The VCB-X Controller is communicating to Orion VAV Boxes and will broadcast a command to the boxes to go to a Fixed Percentage Position or Airflow while in Morning Warm Up. This fixed position is configured in the VAV box controller.
- **Bcast Max to Boxes**—The VCB-X Controller is communicating to Orion VAV Boxes and will broadcast a command to the boxes to go to a Maximum Percentage Position or Airflow while in Morning Warm Up. This maximum position is configured in the VAV box controller.
The VCB-X has an internal schedule. If you want the VCB-X to use its own internal schedule, enter <0> for Internal.

External Schedules are available by using one of the GPC-X family of General Purpose Controllers. Depending on which generation of GPC-X Controller you have, you may have up to 5 or up to 8 schedules available to use. To use the schedules on one of these controllers, enter the number of the schedule on that controller (either 1 through 5 or 1 through 8) you will be using. Default is 0.

### Trend Log Rate

An internal Trend Log is constantly updated at a rate equal to this value. Trend Logs can only be accessed with Prism II software. Default is 15 minutes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend Log Rate</td>
<td>1 Min</td>
<td>15 Min</td>
<td>120 Min</td>
</tr>
</tbody>
</table>

### Emergency Shutdown

Press <0> for YES if a Smoke Detector/Firestat or other Emergency Shutdown input is connected to the Emergency Shutdown binary input. If a Shutdown condition occurs and the 24V signal is removed from this input, the Supply Fan and Heating and Cooling Relay Outputs will be de-energized and an alarm will be generated. Default is NO.

### Dirty Filter

Press <0> for YES if a Dirty Filter switch is connected to the Dirty Filter binary input. If the Dirty Filter input is active, an alarm will be generated. Default is NO.

---

**NOTE:** The U.S. government has the authority to determine the switch-over dates each year. Currently, the time changes the second Sunday in March and then switches back the first Sunday in November.
**Programming**

**VCB-X Configuration Screens**

**Configuration Screen #57 - Broadcast OA Temp**

VCBX Cnfg ID 101
Broadcast Outdoor Temperature: NO
Press ‘0’ To Change

The VCB-X can broadcast its Outdoor Air Temperature Reading to other HVAC units if they are not equipped with their own Outdoor Air Temperature sensors. A network communications device (MiniLink PD or CommLink) is needed in order for this feature to operate. Press <0> for YES - Broadcast Outdoor Temperature. Press <0> for NO. Default is NO.

**Configuration Screen #58 - Broadcast OA RH**

VCBX Cnfg ID 101
Broadcast OA RH
NO
Press ‘0’ To Change

The VCB-X can broadcast its Outdoor Air Humidity Reading to other HVAC units if they are not equipped with their own Outdoor Air RH sensors. A network communications device (MiniLink PD or CommLink) is needed in order for this feature to operate. Press <0> for YES - Broadcast Outdoor RH. Press <0> for NO. Default is NO.

**Configuration Screen #59 - Broadcast Building Pressure**

VCBX Cnfg ID 101
Broadcast Build. Pr.
NO
Press ‘0’ To Change

The VCB-X can broadcast Building Pressure from this unit to any other unit requiring this value. Press <0> for YES - Broadcast Building Pressure. Press <0> for NO. Default is NO.

**Configuration Screen #60 - Broadcast to Boxes**

VCBX Cnfg ID 101
Broadcast to Boxes
NO
Press ‘0’ To Change

The VCB-X can broadcast all applicable information and commands to the VAV Boxes. Press <0> for YES - Broadcast to Boxes. Press <0> for NO. Default is NO.

**Configuration Screen #61-#64 - Cool/Heat Stage Delays**

VCBX Cnfg ID 101
Cool Stage Delays
Stage Up..: 3 Min
Stage Down: 1 Min

VCBX Cnfg ID 101
Cool Stage Delays
Min Run...: 5 Min
Min Off...: 3 Min

VCBX Cnfg ID 101
Heat Stage Delays
Stage Up..: 3 Min
Stage Down: 1 Min

VCBX Cnfg ID 101
Heat Stage Delays
Min Run...: 5 Min
Min Off...: 1 Min

Both the Heating Stages and the DX Cooling Stages utilize Staging Up and Down Delay Periods between stages and Minimum Run Times and Off Times.

See the *VCB-X Controller Technical Guide* for information on how these Delays and Run Times are used.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Stage Up</td>
<td>3 Min</td>
<td>3 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Cooling Stage Down</td>
<td>1 Min</td>
<td>1 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Cooling Min Run Time</td>
<td>5 Min</td>
<td>5 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Cooling Min Off Time</td>
<td>3 Min</td>
<td>3 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Heating Stage Up</td>
<td>3 Min</td>
<td>3 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Heating Stage Down</td>
<td>1 Min</td>
<td>1 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Heating Min Run Time</td>
<td>2 Min</td>
<td>5 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Heating Min Off Time</td>
<td>1 Min</td>
<td>1 Min</td>
<td>15 Min</td>
</tr>
</tbody>
</table>
If your VCB-X is configured to operate as a Heat Pump, the Heat Pump Auxiliary Heating Delay Setpoint can be configured to provide a time delay period before Auxiliary Heating Stages can be activated once activation of the Compressor Heating Stages have been initiated. Default is 3 minutes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aux Heat Delay</td>
<td>0 Min</td>
<td>3 Min</td>
<td>60 Min</td>
</tr>
</tbody>
</table>

Enter the time in minutes for the time delay when the unit changes over from a call to heating to a call to cooling and vice versa. Default is 5 minutes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat/Cool Changeover Delay</td>
<td>0 Min</td>
<td>5 Min</td>
<td>20 Min</td>
</tr>
</tbody>
</table>

Relays #2 through #6 can be individually configured. Only forms of Heating and Cooling can be configured with multiple relays for staging. If any other option is selected more than once, it will simply activate redundant relays, but no multiple staging will occur. Default is Not Used.

Relay #1 is not configurable as it is reserved for the Supply Air Fan. Relays #2-#6 are configurable for the following options (See Table 3 for Relay descriptions):

- Not Used (Default)
- Digital Comp
- Cool Stage
- Heat Stage
- Condenser
- Heat Pump Compressor
- Reversing Valve
- Aux Heat
- Emergency Heat
- Mod Heat Enable
- Low Ambient
- Exhaust Fan
- Economizer Active
- Heat Wheel
- Occupied Active
- Override Active
- Alarm Active

Relays #1 through #5 can be individually configured. Only forms of Heating and Cooling can be configured with multiple relays for staging. If any other option is selected more than once, it will simply activate redundant relays, but no multiple staging will occur. Default is Not Used.
The E-BUS 12 Relay Expansion Board Relays #1-#12 are configurable for the following options (See Table 3 for Relay descriptions):

- Not Used (Default)
- Digital Comp
- Cool Stage
- Heat Stage
- Mod Cool Enable
- Warm Up Command
- Reheat Stage
- Preheat
- Condenser
- Heat Pump Compressor
- Reversing Valve
- Aux Heat
- Emergency Heat
- Mod Heat Enable
- Low Ambient
- Exhaust Fan
- Economizer Active
- Heat Wheel
- Occupied Active
- Override Active
- Alarm Active

Relays #1 through #12 can be individually configured. Only forms of heating and cooling can be configured with multiple relays for staging. If any other option is selected more than once, it will simply activate redundant relays, but no multiple staging will occur. Default is Not Used.

### Table 3: User-Configurable Relay Outputs

<table>
<thead>
<tr>
<th>No.</th>
<th>Relay Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Digital Compressor</td>
<td>Configured for a Digital Compressor.</td>
</tr>
<tr>
<td>2</td>
<td>Cooling Stage</td>
<td>Configured for each fixed stage of cooling (except heat pump compressor).</td>
</tr>
<tr>
<td>3</td>
<td>Condenser</td>
<td>Configured for Condenser Fan operation. This relay will be active anytime a compressor is active, except if the unit is in Heat Pump Defrost Mode.</td>
</tr>
<tr>
<td>4</td>
<td>Heating Stage</td>
<td>Configured for each fixed stage of heating.</td>
</tr>
<tr>
<td>5</td>
<td>Heat Pump Compressor</td>
<td>Configured for a Fixed Heat Pump Compressor stage.</td>
</tr>
<tr>
<td>6</td>
<td>Reversing Valve</td>
<td>Configured for the Reversing Valve of a heat pump unit.</td>
</tr>
<tr>
<td>7</td>
<td>Aux Heat</td>
<td>Configured for a fixed stage of Aux Heat in a heat pump unit.</td>
</tr>
<tr>
<td>8</td>
<td>Emergency Heat</td>
<td>Configured for a fixed stage Emergency Heat in a heat pump unit.</td>
</tr>
<tr>
<td>9</td>
<td>Mod Heat Enable</td>
<td>Configure if a 0-10 VDC Modulating Heat source needs a relay to enable it.</td>
</tr>
<tr>
<td>10</td>
<td>Pre-Heat</td>
<td>Configure for Pre-Heat operation.</td>
</tr>
<tr>
<td>11</td>
<td>Low Ambient</td>
<td>Configure for Low Ambient operation.</td>
</tr>
<tr>
<td>12</td>
<td>Economist Active</td>
<td>If configured, this relay will energize if unit is in Economist mode and the damper has moved 5% above its Economist Minimum Setpoint position.</td>
</tr>
<tr>
<td>13</td>
<td>Occupied Active</td>
<td>If configured, this relay will energize whenever the unit is in the Occupied Mode.</td>
</tr>
<tr>
<td>14</td>
<td>Override Active</td>
<td>If configured, this relay will energize anytime the space sensor Pushbutton override is active.</td>
</tr>
<tr>
<td>15</td>
<td>Alarm Active</td>
<td>If configured, this relay will energize anytime a VCB-X alarm is active.</td>
</tr>
<tr>
<td>16</td>
<td>Mod Cool Enable</td>
<td>Configure if a 0-10 VDC Modulating Cool source needs a relay to enable it.</td>
</tr>
<tr>
<td>17</td>
<td>Morning Warm-Up (VAV Boxes)</td>
<td>Configure (1) Relay for Morning Warm-Up when Non-Orion VAV/Zone Controllers are used.</td>
</tr>
<tr>
<td>18</td>
<td>Reheat</td>
<td>Configure (1) Relay for On/Off Reheat when used.</td>
</tr>
<tr>
<td>19</td>
<td>Exhaust Fan</td>
<td>Configure (1) Relay for enabling exhaust fan when Building Pressure Control is used.</td>
</tr>
<tr>
<td>20</td>
<td>Heat Wheel</td>
<td>Configure (1) Relay that turns heat wheel on when in occupied operation and turns heat wheel off when in Economist Mode.</td>
</tr>
</tbody>
</table>
Setpoints - General Procedures

Modular Service Tool Instructions
From any menu screen, press <Setpoints>. The Unit Selection Screen will appear requesting that you enter the unit ID number.

Enter the correct unit ID number of the VCB-X Controller you want to change Setpoints for and press <Enter>. You will then see Setpoint Screen #1.

Setpoint Screen Index
The available Setpoint Screens for the VCB-X Controller are listed on the next few pages by sequential screen number. When each VCB-X Controller is configured for the first time, it is best to start with screen #1 and proceed to each Setpoint Screen in numerical order until you have viewed all available Setpoint Screens. This ensures that you have seen all of the available VCB-X Controller Setpoint possibilities and have the opportunity to change or accept the defaults for each screen. Once the unit Setpoints are configured and you decide to change one of the screen options, it is helpful to know what screen number contains the configuration you wish to change. With this in mind, the following is a list of all the VCB-X Setpoint Screens in numerical order with a brief listing of the Setpoint feature available on each screen:

- Screen #1: Occupied HVAC Cool/Heat
- Screen #2: Hood On HVAC Setpoints
- Screen #3: Unoccupied Offsets
- Screen #4: Mode Deadband
- Screen #5: Space Sensor Slide Adjust
- Screen #6: Space Sensor Push-Button Override Duration
- Screen #7: Controlling Sensor High Alarm Offset
- Screen #8: Controlling Sensor Low Alarm Offset
- Screen #9: Outdoor Dewpoint Setpoint
- Screen #10: Indoor RH Setpoint
- Screen #11: Coil Temperature Setpoint
- Screen #12: Static Pressure Setpoint
- Screen #13: VFD Speed Limits - Min Cool/Min Vent
- Screen #14: VFD Speed Limits - Min/Max Heat
- Screen #15: Supply Air Cooling Setpoint and High Reset Limit
- Screen #16: Cool Reset Source Setpoints - If High Space, then SAT
- Screen #17: Cool Reset Source Setpoints - Low Space/High Reset/VFD
- Screen #18: Supply Air Heating Setpoint and High Reset Limit
- Screen #19: High Reset Source Setpoints - High Space/SAT/VFD
- Screen #20: High Reset Source Setpoints - Low Space/High Reset/VFD
- Screen #21: Stage Off Window Cooling/Heating
- Screen #22: Mod Heat Proportional Window and Time Period
- Screen #23: Mod Cool Proportional Window and Time Period
- Screen #24: Head Pressure Setpoints - Cooling and Reheat
- Screen #25: Economizer Enable Setpoint
- Screen #26: Economizer Minimum Damper Position
- Screen #27: Maximum Economizer Position in Heat Mode
- Screen #28: Min Outdoor Airflow Setpoint and Deadband
- Screen #29: Economizer Maximum Position in High CO₂
- Screen #30: CO₂ Setpoints Min/Max
- Screen #31: CO₂ Altitude Setpoint
- Screen #32: Building Pressure Setpoint and Deadband
- Screen #33: OAT Lockouts - Comp Cool/Comp Heat
- Screen #34: OAT Lockouts Heat
- Screen #35: Supply Air Cutoffs - Cooling/Heating
- Screen #36: Mod Heat Output Position in Off Mode
- Screen #37: Preheat Relay Setpoint
- Screen #38: Low Ambient Setpoint
- Screen #39: Heat Pump Defrost Interval
- Screen #40: Adaptive Defrost Interval Adjustment
- Screen #41: Heat Wheel Defrost
- Screen #42: Morning Warm Up Max Length and Target Temp
- Screen #43: Space Sensor Calibration - Current and Offset
- Screen #44: RAT Sensor Calibration - Current and Offset
- Screen #45: SAT Sensor Calibration - Current and Offset
- Screen #46: Coil Sensor Calibration - Current and Offset
- Screen #47: OAT Sensor Calibration - Current and Offset
- Screen #48: CO₂ Sensor Calibration - Current and Offset
**Programming**

**VCB-X Setpoint Screens**

### Setpoint Screen #1 - Occupied HVAC Cool/Heat Setpoints

VCB Spts ID 101

Occupied HVAC Spts
- Cooling: 75.0
- Heating: 70.0

These Setpoints are used to determine the Heating, Cooling, or Vent Mode of operation in CAV applications using the Space or Return Air Temperature Sensor as the Mode Enable Sensor (HVAC Source) or in Make Up Air (MUA) applications using the Outdoor Air Temperature Sensor as the Mode Enable Sensor (HVAC Source).

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Mode Setpoints</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>1°F</td>
<td>75°F</td>
<td>110°F</td>
</tr>
<tr>
<td>(-17.2°C)</td>
<td>(24°C)</td>
<td></td>
<td>(43.3°C)</td>
</tr>
<tr>
<td>Heating</td>
<td>1°F</td>
<td>70°F</td>
<td>110°F</td>
</tr>
<tr>
<td>(-17.2°C)</td>
<td>(21°C)</td>
<td></td>
<td>(43.3°C)</td>
</tr>
</tbody>
</table>

### Setpoint Screen #2 - Hood On HVAC Setpoints - OAT Cool, OAT Heat

VCB Spts ID 101

Hood On HVAC Spts
- OAT Cool: 75.0
- OAT Heat: 70.0

These setpoints are only used in a CAV/MUA Dual Mode (Hood On/Off) application. In CAV (Hood Off) operation, the unit will use the Occupied HVAC Setpoints from Setpoint Screen #1 in reference to a Space or Return Air Temperature Sensor. When exhaust hoods are turned on and the Hood On contact closes, the unit switches from CAV Space Temperature Control to MUA Outdoor Air Temperature control operation (Hood On). At this point the Outdoor Damper modulates to full open, and these setpoints become the Outdoor Air Temperature Mode Enable Setpoints.

### Setpoint Screen #3 - Unoccupied Offsets - Cooling & Heating

VCB Spts ID 101

Unoccupied Offsets
- Cooling: 30.0
- Heating: 30.0

During the Unoccupied Mode of Operation, these Setpoints spread the HVAC Mode Setpoints out by this user-adjustable amount. Use only positive numbers for these Setpoints. If you do not want Cooling or Heating to operate during the Unoccupied Mode, use the default setting of 30°F for these setpoints.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unoccupied</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offsets Cooling</td>
<td>0°F</td>
<td>30°F</td>
<td>30°F</td>
</tr>
<tr>
<td>(0°C)</td>
<td>(16.6°C)</td>
<td></td>
<td>(16.6°C)</td>
</tr>
<tr>
<td>Unoccupied</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offsets Heating</td>
<td>0°F</td>
<td>30°F</td>
<td>30°F</td>
</tr>
<tr>
<td>(0°C)</td>
<td>(16.6°C)</td>
<td></td>
<td>(16.6°C)</td>
</tr>
</tbody>
</table>

### Setpoint Screen #4 - Mode Deadband

VCB Spts ID 101

Mode Deadband
- Setpt: 1.0

This Setpoint is added to and subtracted from the HVAC Mode Setpoints to determine when the unit enters and leaves a mode of operation.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select</td>
<td>1°F</td>
<td>1°F</td>
<td>10°F</td>
</tr>
<tr>
<td>Deadband</td>
<td>(-.6°C)</td>
<td>(-.6°C)</td>
<td>(5.5°C)</td>
</tr>
</tbody>
</table>
Setpoint Screen #5 - Space Sensor Slide Adjust

VCBX Spts ID 101
Space Sensor
Slide Adj: 0

If the VCB-X has a Space Temperature Sensor with the Slide Adjust option installed, the HVAC Mode Enable Heating and Cooling Setpoints can be offset by the HVAC Mode Sensor Slide Offset Setpoint value. When the Slide Adjust bar is in the middle, no offset will occur. If the Slide Adjust bar is moved all the way to the top of the Sensor, the Heating and Cooling Setpoints will be raised by the Setpoint value you have entered. If the Slide Adjust bar is moved all the way down to the bottom of the Sensor, the Heating and Cooling Setpoints will be lowered by the Setpoint value you have entered.

If the Space Temperature is the SAT Reset Source, then the Slide Adjust will adjust the HVAC Mode Enable Setpoints and the SAT Reset Source Setpoints simultaneously.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Sensor Slide Adjust</td>
<td>0ºF (0ºC)</td>
<td>0ºF (0ºC)</td>
<td>10ºF (5.5ºC)</td>
</tr>
</tbody>
</table>

Setpoint Screen #6 - Space Sensor Push-Button Override Duration

VCBX Spts ID 101
Space Sensor Push Button Override Duration: 2.0Hr

If the VCB-X has a Space Temperature Sensor installed and it has the Override Button option, the HVAC unit will initiate Override Mode any time the Override Button is pressed and held for less than 3 seconds. This puts the unit into Occupied operation. The Push-Button Override Duration Setpoint allows you to adjust the amount of time the Override will remain in effect when the Override Button is pressed. To cancel the Override before the Override Duration time period expires, press the Override Button for 5 to 10 seconds.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Sensor Push-Button Override Duration</td>
<td>0.0 Hr</td>
<td>2.0 Hr</td>
<td>8.0 Hr</td>
</tr>
</tbody>
</table>

Setpoint Screen #7 - Controlling Sensor High Alarm Offset

VCBX Spts ID 101
Controlling Sensor
High Alarm Offset
Setpt: 30.0

If the Temperature of the controlling sensor rises above the Occupied Cooling Setpoint by this amount during the Cooling Mode, the controller will generate a High Control Temp Alarm. The unit must be configured for Space Temperature Control, Return Air Temperature Control, or as a Single Zone VAV unit for this alarm to be generated.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlling Sensor High Alarm Offset</td>
<td>0ºF (0ºC)</td>
<td>30ºF (16.6ºC)</td>
<td>50ºF (27.7ºC)</td>
</tr>
</tbody>
</table>

Setpoint Screen #8 - Controlling Sensor Low Alarm Offset

VCBX Spts ID 101
Controlling Sensor Low Alarm Offset
Setpt: 30.0

If the Temperature of the controlling sensor falls below the Occupied Heating Setpoint by this amount during the Heating Mode, the controller will generate a Low Control Temp Alarm. The unit must be configured for Space Temperature Control, Return Air Temperature Control, or as a Single Zone VAV unit for this alarm to be generated.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlling Sensor Low Alarm Offset</td>
<td>0ºF (0ºC)</td>
<td>30ºF (16.6ºC)</td>
<td>50ºF (27.7ºC)</td>
</tr>
</tbody>
</table>

Setpoint Screen #9 - Outdoor Dewpoint Setpoint

VCBX Spts ID 101
Outdoor Dewpoint
Setpt: 55.0

On MUA configured units (100% or high percentage Outdoor Air units), or if this is a unit in Hood On MUA operation, Dehumidification will be initiated if the Outdoor Air Dewpoint rises above this setpoint. If the humidity falls 1% below this setpoint, the unit will leave the Dehumidification Mode.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor Dewpoint Setpoint</td>
<td>35ºF (1.7ºC)</td>
<td>55ºF (12.8ºC)</td>
<td>80ºF (26.6ºC)</td>
</tr>
</tbody>
</table>
This screen can be used to set the Space Humidity Setpoint and to set the Space Humidity Reset range used to reset the Suction Coil Temperature Setpoint.

On units where Indoor Humidity is used to initiate Dehumidification (non MUA units), the Low Reset Source (Lo Rst Src) is the Dehumidification Setpoint, and as the Indoor Humidity rises above this setpoint, Dehumidification will be initiated. If the humidity falls 1% below this setpoint, the unit will leave the Dehumidification Mode.

If no reset of the Coil Temperature Setpoint is desired, set the High Reset Source (Hi Rst Src) at the same value as the Low Reset Source. If reset of the Coil Temperature Setpoint is desired, when the Indoor Humidity rises above the Low Reset Source, Dehumidification will be initiated and the Coil Temperature Setpoint will be set at the Coil Temperature High Reset Limit (configured in the next screen).

The High Reset Source (Hi Rst Src) is the Indoor Humidity level at which the Coil Temperature will be reset to the Coil Temperature Low Reset Limit (configured in the next screen). As the Indoor Humidity rises between the Low Reset Source and the High Reset Source, the Coil Temperature Setpoint will be proportionally reset between the Coil Temperature High Reset Limit down to the Coil Temperature Low Reset Limit.

On MUA units where the Outdoor Dewpoint Setpoint is used to initiate Dehumidification, this screen is only used to set the Indoor Humidity values that will reset the Coil Temperature Setpoint. As described above, as the Indoor Humidity rises within the range created by the Low and High Reset Source Setpoints, the Coil Temperature Setpoint will be proportionally reset between the High and Low Coil Temperature Reset Limits.

### Setpoint Screen #12 - Static Pressure Setpoint

For VAV units, a Supply Fan VFD or Bypass Damper Actuator is used to maintain the Duct Static Pressure Setpoint. The Static Pressure Output Signal varies to control to the Static Pressure Setpoint. The Duct Static Pressure is maintained at this setpoint anytime the Main Fan is running.

The Duct Static Setpoint accuracy is controlled by this value. No Main Fan VFD changes are made if the static is within this range of this setpoint.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Pressure Spt</td>
<td>0.10&quot; WG</td>
<td>1.50&quot; WG</td>
<td>3.0&quot; WG</td>
</tr>
<tr>
<td>Deadband</td>
<td>0.01&quot; WG</td>
<td>0.10&quot; WG</td>
<td>0.50&quot; WG</td>
</tr>
</tbody>
</table>
**Setpoint Screen #13 - VFD Speed Minimums Cool/Vent Modes**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Cool</td>
<td>0%</td>
<td>30%</td>
<td>100%</td>
</tr>
<tr>
<td>Minimum Vent</td>
<td>0%</td>
<td>20%</td>
<td>100%</td>
</tr>
</tbody>
</table>

If this unit is configured for Single Zone VAV operation, the Min Cool Percentage will be the fan speed at which the VFD will start operating at when cooling is initiated. It can then modulate up to 100% as the space temperature rises within the range created by the Low Space (Low Spc) and the High Space (Hi Spc) Setpoints entered in Setpoint Screens #16 and 17. On a standard VAV unit, this will be the lowest fan speed the VFD will operate at in the Cooling Mode as it controls to the Duct Static Pressure Setpoint. If this is a CAV or MUA unit, this should be set to 100%.

The Min Vent Percentage is the speed at which the fan will operate at during the Vent Mode.

**Setpoint Screen #14 - VFD Speed Limits Min/Max Heat**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Heat</td>
<td>0%</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>Maximum Heat</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

If this unit is configured for Single Zone VAV operation, and you have a modulating heat source that will allow VAV heating, then the Min Heat Percentage will be the fan speed at which the VFD will start operating at when heating is initiated. It can then modulate up to the Max Heat Percentage as the Space Temperature falls within the range created by the Hi Space setpoint and the Low Space Setpoint created in Setpoint Screens #19 and 20. On a standard VAV unit, these setpoints will be the Min and Max fan speeds the unit will operate at in the Heating Mode as it controls to the Duct Static Pressure Setpoint. If this is a CAV, MUA, or Single Zone VAV with CAV Heating, these setpoints should both be set at the same value which represents the constant speed you want the fan to operate at during the Heating Mode.
Setpoint Screen #16 - Cool Reset Source Setpoints - High Space/SAT/VFD

VCBX Spts ID 101
Cool Rst Source Spts
If Hi Spc: 75.0
Then SAT: 55

If no SAT Reset Source has been configured in Configuration Screen #6 and the unit has not been configured for Single Zone VAV, then this screen will read, “No Cool Rst Config” and will not be used. If the unit has been configured for Single Zone VAV, see the last paragraph for this screen.

If a Reset Source has been configured in Configuration Screen #6, the third line will display “If Hi Spc”, “If Hi OAT”, “If Hi RAT”, or “If Hi VFD” – depending on the Reset option that has been chosen. This screen will then allow you to input the upper limit for the Reset Source on Line 3. Line 4 (Then SAT) will show the corresponding Supply Air Cooling Setpoint that was entered on Setpoint Screen #15.

Please note that the SAT value cannot be changed on this screen; it is simply displayed from what was entered on the Setpoint Screen #15. The value on Line 3 corresponds to the value on Line 4. So, if the Space Temperature Sensor has been configured as the Reset Source, then when the Space Temperature is at or above the Hi Spc Temperature Setpoint, the Supply Air Cooling Setpoint will be reset to its lowest value, the SAT Setpoint. Then, as the Space Temperature moves from this high value (Hi Spc) to its low value (Low Spc) configured on Setpoint Screen #17, the Supply Air Cooling Setpoint will be proportionally reset from the SAT Setpoint to the Hi Rst Limit Setpoint. See Cooling Supply Air Reset examples under Setpoint Screen #17.

VCBX Spts ID 101
SZ VAV Fan Cool Rst
If Hi Spc: 75.0
Then VFD: 100%

If this is was configured for Single Zone VAV application on Configuration Screen #5, this screen will appear. In the Cooling Mode, the Supply Fan VFD speed will proportionally modulate as the Space Temperature rises within the range set on this screen and the next screen. Upon entering the Cooling Mode, the fan will start at the Min Cooling VFD Speed (entered on Setpoint Screen #13) and modulate up to 100% as the Space Temperature rises from the Low Spc Setpoint (entered on the next screen) to the Hi Spc Setpoint entered on this screen. So, on this screen the Hi Spc Setpoint will correspond to the 100% VFD speed. Please note that the VFD speed is fixed at 100% on this screen and cannot be changed.

See Single Zone VAV Reset example under Setpoint Screen #17.

Setpoint Screen #17 - Cool Reset Source Setpoints - Low Space/High Reset/VFD

VCBX Spts ID 101
Cool Rst Source Spts
If Low Spc: 70.0
Then Hi Rst: 55

If no SAT Reset Source has been configured in Configuration Screen #6 and the unit has not been configured for Single Zone VAV, then this screen will read, “No Cool Rst Config” and will not be used. If the unit has been configured for Single Zone VAV, see the last paragraph for this screen.

If a Reset Source has been configured in Configuration Screen #6, the third line will display “If Low Spc”, “If Low OAT”, “If Low RAT”, or “If Low VFD” – depending on the Reset option that has been chosen. This screen will then allow you to input the lower limit for the Reset Source on Line 3. Line 4 (Then SAT) will show the corresponding Supply Air Cooling Hi Rst Setpoint that was entered on Setpoint Screen #15.

Please note that the Rst Limit value cannot be changed on this screen; it is simply displayed from what was entered on the Setpoint Screen #15. The value on Line 3 corresponds to the value on Line 4. So, if the Space Temperature Sensor has been configured as the Reset Source, then when the Space Temperature is at or below the Low Spc Setpoint, the Supply Air Cooling Setpoint will be reset to its highest value, the Cooling Hi Rst Value. Then, as the Space Temperature moves from this low value (Low Spc) to its high value (Hi Spc) configured on Setpoint Screen #16, the Supply Air Cooling Setpoint will be proportionally reset from the Hi Rst Limit Setpoint to its SAT Setpoint.

Cooling Supply Air Reset Setpoints Examples:

Space Temperature Cooling Reset of SAT Setpoint:

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Hi Space</td>
<td>1°F (-17.2°C)</td>
<td>75°F (24°C)</td>
<td>150°F (65.5°C)</td>
</tr>
</tbody>
</table>

VFD Percentage Cooling Reset of SAT Setpoint:

VFD Percentage (Hi VFD) = 100% SAT Stpt (Hi Rst) = 65°F
VFD Percentage (Low VFD) = 30% SAT Stpt (Hi Rst) = 65°F

See Single Zone VAV Reset example under Setpoint Screen #17.
VCBX Setpoint Screens

### Setpoint Screen #18 - Supply Air Heating Setpoint and High Reset Limit

**VCBX Spts ID 101**

**Supply Air Heating Setpt**......: **120.0**

**Hi Rst Limit**...: **120.0**

If no Reset Source has been configured in Configuration Screen #6, then this setpoint will be the Supply Air Temperature Heating Setpoint. Line 4 will not be used. If a Reset Source has been configured in Configuration Screen #6, then Line 4 will be used. Reset is always upward from the SAT setpoint to the Hi Rst Limit setpoint. So, the SAT will be the lowest temperature the Supply Air Setpoint can be reset to and Reset Limit will be the highest temperature the Supply Air Setpoint can be reset to. The Heating Supply Air Temperature Setpoint will automatically be reset warmer or colder within this range as the Reset Source moves within its range (created in the next two screens).

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT Heating Spt</td>
<td>40°F (4.5°C)</td>
<td>120°F (48°C)</td>
<td>240°F (115.5°C)</td>
</tr>
<tr>
<td>Reset Limit Spt</td>
<td>0°F (-17.7°C)</td>
<td>120°F (48°C)</td>
<td>250°F (121.1°C)</td>
</tr>
</tbody>
</table>

### Setpoint Screen #19 - Heat Reset Source Setpoints - High Space/SAT/VFD

**VCBX Spts ID 101**

**Heat Rst Source Spts**

If Hi Spc: **75.0**

Then SAT: **55**

If no SAT Reset Source has been configured in Configuration Screen #6 and the unit has not been configured for Single Zone VAV, then this screen will appear. In the Heating Mode, the Supply Fan VFD speed will proportionally modulate as the Space Temperature rises within the range set on this screen and the previous screen. Upon entering the Heating Mode, the fan will start at the Min Cooling VFD Speed (entered on Setpoint Screen #13) and modulate up to 100% as the Space Temperature rises from the Low Spc Setpoint (entered on this screen) to the Hi Spc Setpoint entered on the previous screen. So, on this screen the Low Spc Setpoint should correspond to the VFD Min Cool Setpoint from Setpoint Screen #13. Please note that the VFD speed cannot be changed on this screen; it is simply displayed from what was entered as the Min Cool VFD Speed entered on Setpoint Screen #13.

If this unit was configured for Single Zone VAV application on Configuration Screen #5, this screen will appear. In the Cooling Mode, the Supply Fan VFD speed will proportionally modulate as the Space Temperature falls within the range set on this screen and the previous screen. Upon entering the Cooling Mode, the fan will start at the Min Heating VFD Speed (entered on Setpoint Screen #14) and modulate up to the Max Heat VFD Speed (entered on Setpoint Screen #14) as the Space Temperature falls from the Hi Spc Setpoint (entered on this screen) to the Low Spc Setpoint entered on the next screen. So, on this screen the Hi Spc Setpoint would correspond to the Min Heat VFD speed. Please note that the VFD Speed displayed on this screen cannot be changed on this screen; it is simply displayed from what was entered as the Min Heat VFD Speed on Setpoint Screen #14.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Hi Space</td>
<td>1°F (-17.7°C)</td>
<td>75°F (24°C)</td>
<td>150°F (65.5°C)</td>
</tr>
</tbody>
</table>

---

**Single Zone VFD Cooling Reset Examples:**

- **Space Temp (Hi Spc) = 75°F**
  - **VFD Speed (Then VFD) = 100%**

- **Space Temp (Low Spc) = 72°F**
  - **VFD Speed (Then VFD) = 30%**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Low Space</td>
<td>-10°F (-23.3°C)</td>
<td>70°F (21°C)</td>
<td>150°F (65.5°C)</td>
</tr>
</tbody>
</table>

---

**VCBX Spts ID 101**

**SZ VAV Fan Cool Rst**

If Low Spc: **70.0**

Then VFD: **30%**

If the Space Temperature Sensor has been configured for Single Zone VAV, see the last paragraph for this screen.
If no SAT Reset Source has been configured in Configuration Screen #6 and the unit has not been configured for Single Zone VAV, then this screen will read, “No Heat Rst Config” and will not be used. If the unit has been configured for Single Zone VAV, see the last paragraph for this screen.

If a Reset Source has been configured in Configuration Screen #6, the third line will display “If Low Spc”, “If Low OAT”, “If Low RAT”, or “If Low VFD” – depending on the Reset option that has been chosen. This screen will then allow you to input the lower limit for the Reset Source on Line 3. Line 4 (Then SAT) will show the corresponding Supply Air Heating Hi Rst Setpoint that was entered on Setpoint Screen #15. The exception is for “If Low VFD”. When using VFD Reset in the Heating Mode, the “Low VFD” value will correspond to the Supply Air Heating “Setpt” value entered on Screen #15.

Please note that the Low Rst (or SAT) value cannot be changed on this screen; it is simply displayed from what was entered on the Setpoint Screen #18. The value on Line 3 corresponds to the value on Line 4. So, if the Space Temperature Sensor has been configured as the Reset Source, then when the Space Temperature is at or below the Low Spc Setpoint, the Supply Air Heating Setpoint will be reset to its lowest value, the Heating Hi Rst Value. Then, as the Space Temperature moves from this low value (Low Spc) to its high value (Hi Spc) configured on Setpoint Screen #19, the Supply Air Cooling Setpoint will be proportionally reset from the Hi Rst Limit Setpoint to its SAT Setpoint.

Heating Supply Air Reset Examples:

Space Temperature Heating Reset of SAT Setpoint:
Space Temp (Hi Spc) = 71°F  VFD Speed (Then VFD) = 50%
Space Temp (Low Spc) = 68°F  VFD Speed (Then VFD) = 90%

VFD Percentage Heating Reset of SAT Setpoint:
VFD Percentage (Hi VFD) = 100%  SAT Stpt (SAT) = 90°F
VFD Percentage (Low VFD) = 30%  SAT Stpt (Hi Rst) = 120°F

When the VCB-X Controller is in Cooling Mode, if the Supply Air Temperature drops below the Active Supply Air Cooling Setpoint minus the Cooling Stage Off Window value, a Cooling Stage will be deactivated after its Minimum Run Time. In the Heating Mode, if the Supply Air Temperature rises above the Active Supply Air Heating Setpoint plus the Heating Stage Off Window value, a Heating stage will be deactivated after its Minimum Run Time.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage Off Window</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>1°F (.6°C)</td>
<td>5°F (2.8°C)</td>
<td>30°F (16.6°C)</td>
</tr>
<tr>
<td>Heating</td>
<td>1°F (.6°C)</td>
<td>5°F (2.8°C)</td>
<td>30°F (16.6°C)</td>
</tr>
</tbody>
</table>
**Setpoint Screen #22 - Mod Heat Proportional Window and Time Period**

| VCBX Spts ID 101 | Mod Heat Prop Window: 5.0 | Time Period: 30.0s |

The Modulating Heating Proportional Window is the control range of the Modulating Signal above and below the Active Supply Air Temperature Setpoint. The size of the Proportional Window will determine how much of a signal change the controller will make per Time Period for every 1°F the Supply Air Temperature is from setpoint. The maximum signal change per time period is 10% which occurs when the Supply Air Temperature is the full Proportional Window amount from setpoint. So, with a 5°F Proportional Window, if the Supply Air Temperature is 5°F or more from setpoint, the signal change will be 10% per time period. At 4°F difference, the signal change will be 8% per time period. By the time the difference is 1°F, the signal change will be 2% per time period. With a Proportional Window of 2°F, if you are 2°F or more from setpoint, the amount of signal change will be 10% per time period, and at 1°F from setpoint the change would be 5% per time period. So, a larger proportional window allows for finer tuning of the control signal to prevent overshooting.

The Time Period is the length of time between Modulating Signal adjustments. Short Time Periods may cause hunting of the Modulating Signal.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mod Cool Proportional Window</td>
<td>1°F (0.1°C)</td>
<td>10°F (5.5°C)</td>
<td>30°F (16.6°C)</td>
</tr>
<tr>
<td>Mod Cool Time Period</td>
<td>5 sec</td>
<td>30 sec</td>
<td>240 sec</td>
</tr>
</tbody>
</table>

**Setpoint Screen #23 - Mod Cool Proportional Window and Time Period**

| VCBX Spts ID 101 | Mod Cool Prop Window: 10.0 | Time Period: 30.0s |

The Modulating Cooling Proportional Window is the control range of the Modulating Signal above and below the Active Supply Air Temperature Setpoint. The size of the Proportional Window will determine how much of a signal change the controller will make per Time Period for every 1°F the Supply Air Temperature is from setpoint. The maximum signal change per time period is 10% which occurs when the Supply Air Temperature is the full Proportional Window amount from setpoint. So, with a 5°F Proportional Window, if the Supply Air Temperature is 5°F or more from setpoint, the signal change will be 10% per time period. At 4°F difference, the signal change will be 8% per time period. By the time the difference is 1°F, the signal change will be 2% per time period. With a Proportional Window of 2°F, if you are 2°F or more from setpoint, the amount of signal change will be 10% per time period, and at 1°F from setpoint the change would be 5% per time period. So, a larger proportional window allows for finer tuning of the control signal to prevent overshooting.

The Time Period is the length of time between Modulating Signal adjustments. Short Time Periods may cause hunting of the Modulating Signal.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Head Pressure Setpoint</td>
<td>240 PSI</td>
<td>315 PSI</td>
<td>420 PSI</td>
</tr>
<tr>
<td>Reheat Head Pressure Setpoint</td>
<td>240 PSI</td>
<td>400 PSI</td>
<td>420 PSI</td>
</tr>
</tbody>
</table>

**Setpoint Screen #24 - Head Pressure Setpoints - Cooling and Reheat**

| VCBX Spts ID 101 | Head Pressure Spts Cooling: 315PSI Reheat: 400PSI |

If a Head Pressure Transducer is connected to the VCB-X EM1 Module you can control a Condenser Fan or a Condenser Water Valve to maintain these Head Pressure Setpoints in the Cooling and Dehumidification Reheat Modes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Head Pressure Setpoint</td>
<td>240 PSI</td>
<td>315 PSI</td>
<td>420 PSI</td>
</tr>
<tr>
<td>Reheat Head Pressure Setpoint</td>
<td>240 PSI</td>
<td>400 PSI</td>
<td>420 PSI</td>
</tr>
</tbody>
</table>

**Setpoint Screen #25 - Economizer Enable Setpoint**

| VCBX Spts ID 101 | Economizer Enable Setpt: 55.0 |

If this unit has been configured for Economizer control and an Outdoor Humidity Sensor is not connected to the VCB-X Controller, if the Outdoor Temperature falls below this setpoint, the Economizer can be used for free cooling. If a combination Outdoor Air Temperature/Humidity Sensor is connected to the VCB-X Controller and the Wetbulb or Dewpoint Temperature falls below this setpoint, the Economizer can be used for free cooling.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economizer Enable</td>
<td>-30°F (-34.4°C)</td>
<td>55°F (12.8°C)</td>
<td>80°F (26.6°C)</td>
</tr>
</tbody>
</table>
Programming

VCB-X Setpoint Screens

Setpoint Screen #26 - Economizer Minimum Damper Position

VCBX Spts ID 101
Economizer Min Damper Pos: 10%

The Economizer (OA Damper) Minimum Position Setpoint is maintained during the Occupied Mode even if the Economizer is disabled due to the OA Temperature being above the Economizer Enable Setpoint.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economizer Min Position</td>
<td>0%</td>
<td>10%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Setpoint Screen #27 - Maximum Economizer Position in Heat Mode

VCBX Spts ID 101
Max Econo Pos in Heat Mode: 50%

This Setpoint allows you to set the Maximum Position the Outdoor Air Damper will open to while Heating is operating. This takes priority over the Economizer Maximum Position in High CO₂ Setpoint.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Economizer Position in Heat Mode</td>
<td>0%</td>
<td>50%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Setpoint Screen #28 - Minimum Outdoor Airflow

VCBX Spts ID 101
Min. Outdoor Airflow Setpt.: 2.00 kCFM
Deadband.: 200 CFM

If controlling the Outdoor Air Damper to an airflow setpoint, this screen allows you to set the design Minimum Outdoor Air CFM Setpoint. The Deadband is used both above and below the setpoint to help prevent hunting.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Outdoor Airflow Setpoint</td>
<td>0.10 kCFM</td>
<td>2.00 kCFM</td>
<td>200 kCFM</td>
</tr>
<tr>
<td>Deadband</td>
<td>10 CFM</td>
<td>200 CFM</td>
<td>9999 CFM</td>
</tr>
</tbody>
</table>

Setpoint Screen #29 - Economizer Maximum Position in High CO₂ Level

VCBX Spts ID 101
Econo Max Pos In High Co₂: 50%

This Setpoint allows you to set the Maximum Position the Economizer will open if high CO₂ conditions occur in the space. The Maximum Economizer Position Setpoint is used to limit the amount of Outdoor Air that will be introduced to the HVAC unit in order to ensure the unit is operating within its Heating and Cooling design limitations. As shown in the table that follows, the Minimum setting for this Setpoint is the value previously set for the Economizer Min Position Setpoint.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Economizer Position in High CO₂</td>
<td>50%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

CO₂ override cannot be used in conjunction with airflow control of the Outdoor Air damper (previous screen) in this version.

Setpoint Screen #30 - CO₂ Setpoints Min/Max

VCBX Spts ID 101
Co2 Setpoints
Min Co2: 900
Max Co2: 1000

The Min CO₂ Setpoint is the threshold CO₂ level at which the Economizer Min Damper Position (Setpoint Screen #26) will begin to be reset higher. The Max CO₂ Setpoint is the CO₂ level at which the Economizer Min Damper Position will be reset to the Econo Max Pos In High CO₂ (Setpoint Screen #28). In between those CO₂ levels, the Economizer Minimum Position will be proportionally reset between the values set in Setpoint Screens #26 and #28.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum CO₂ Level</td>
<td>0 PPM</td>
<td>900 PPM</td>
<td>2000 PPM</td>
</tr>
<tr>
<td>Maximum CO₂ Level</td>
<td>0 PPM</td>
<td>1000 PPM</td>
<td>2000 PPM</td>
</tr>
</tbody>
</table>

VCB-X Setpoint Screens
Setpoint Screen #31 - CO₂ Altitude Setpoint

VCBX Spts ID 101
Altitude
Setpt: 1000ft

Enter the distance above sea level for the installed Carbon Dioxide Sensor. Altitude correction is required for valid readings if you are above 500 feet. High limit = 15,000 feet; Low limit = 0 feet

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude Setpoint</td>
<td>0 Feet</td>
<td>1000 Ft.</td>
<td>15,000 Ft.</td>
</tr>
</tbody>
</table>

Setpoint Screen #32 - Building Pressure

VCBX Spts ID 59
Building Pressure
Setpt....: 0.02"
Deadband....: 0.01"

The VCB-X can maintain Building Static Pressure anytime the Supply Fan is operating. A Building Pressure Transducer must be connected to the VCB-X EM1 Expansion Module. The following are the available control options.

Direct Acting Building Pressure Control

• On/Off Exhaust Fan—If an On/Off Exhaust Fan is being used, a relay output must be configured for “Exhaust Fan”. This relay will energize whenever the Building Pressure rises above the Building Pressure Setpoint by the Deadband amount. The relay will de-energize when the Building Pressure falls below the Building Pressure Setpoint by the Deadband amount.

• Exhaust Fan VFD or Modulating Exhaust Damper—If configured for Modulating Exhaust, a user-adjustable voltage output (AOUT1 – Building Pressure Output on the VCB-X EM1 Expansion Module) will be used to control this fan or damper. An Exhaust Relay can be configured if necessary to enable the fan or damper. Whenever the Building Pressure rises above the Building Pressure Setpoint by the Deadband amount, the Exhaust Fan Relay will energize and the Modulating Signal will activate to control to the Building Pressure Setpoint. If the Building Pressure falls below the Building Pressure Setpoint by the Deadband amount, the Exhaust Fan Relay will de-energize and the Modulating Signal will modulate towards 0% as it attempts to maintain the Building Pressure Setpoint. The Exhaust Fan Relay is energized whenever the Modulating Signal is above 0%.

Reverse Acting Building Pressure Control

• Outdoor Air Damper—If this option is configured, the VCB-X will use the user-adjustable Economizer/Outdoor Air Damper output signal (AOUT2 – Economizer Control Signal) to maintain the Building Pressure Setpoint. Whenever the Building Pressure falls below the Building Pressure Setpoint by the Deadband amount, the modulating Economizer Output Signal will modulate the damper open to control to the Building Pressure Setpoint. If the Building Pressure rises above the Building Pressure Setpoint by the Deadband amount, the damper will modulate towards closed as it attempts to maintain the Building Pressure Setpoint. When this option is selected, no Economizer free cooling or CO₂ IAQ operation will be available.

• Supply Fan VFD – Contact WattMaster regarding this Reverse Acting Building Pressure Control option. It should not be used in most applications. If this option is selected, the user-adjustable Supply Fan VFD Output (AOUT1 on the VCB-X) will be used to control the Supply Fan VFD to maintain the Building Pressure Setpoint in similar fashion to the Outdoor Air Damper control described above.

<table>
<thead>
<tr>
<th>Description</th>
<th>Min.</th>
<th>Default</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Pressure Spt</td>
<td>-0.20&quot; WG</td>
<td>0.02&quot; WG</td>
<td>0.20&quot; WG</td>
</tr>
<tr>
<td>Building Pressure Deadband</td>
<td>0.01&quot; WG</td>
<td>0.01&quot; WG</td>
<td>0.10&quot; WG</td>
</tr>
</tbody>
</table>

Setpoint Screen #33 - OAT Lockouts - Comp Cool/Comp Heat

VCBX Spts ID 101
OAT Lockouts
Comp Cool: 50.0
Comp Heat: 35.0

The VCB-X will Lockout Compressor (Mechanical) Cooling and Heat Pump Compressor Heating when the Outdoor Air Temperature is below these Compressor Cool and Heat Lockout Setpoints.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAT Lockout Comp. Cooling</td>
<td>-30°F (-34.4°C)</td>
<td>50°F (10°C)</td>
<td>100°F (37.7°C)</td>
</tr>
<tr>
<td>OAT Lockout Comp. Heating</td>
<td>-30°F (-34.4°C)</td>
<td>35°F (1.6°C)</td>
<td>100°F (37.7°C)</td>
</tr>
</tbody>
</table>
**Programming**

**V CB-X Setpoint Screens**

**Setpoint Screen #34 - OAT Lockouts - Heat**

VCBX Spts ID 101
OAT Lockouts
Heat: 90.0

The VCB-X will Lockout Mechanical Heating when the Outdoor Air Temperature is above this Setpoint.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAT Lockouts Heating</td>
<td>35ºF (1.7ºC)</td>
<td>90ºF (32.2ºC)</td>
<td>150ºF (65.5ºC)</td>
</tr>
</tbody>
</table>

**Setpoint Screen #35 - Supply Air Cutoffs - Cooling/Heating**

VCBX Spts ID 101
Supply Air Cutoffs
Cooling: 40.0
Heating: 150.0

The VCB-X controller will temporarily disable Heating or Cooling if while in Heating or Cooling Mode the Supply Air Temperature rises above the Hi SAT Cutoff Heating Setpoint or falls below the Lo SAT Cutoff Cooling Setpoint. See the *VCB-X Controller Technical Guide* for detailed information on the Lo and Hi Supply Air Temperature Cutoff sequence of operation.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling SAT Cutoff</td>
<td>0ºF (-17.7ºC)</td>
<td>40ºF (4.5ºC)</td>
<td>100ºF (37.7ºC)</td>
</tr>
<tr>
<td>Heating SAT Cutoff</td>
<td>0ºF (-17.7ºC)</td>
<td>150ºF (65.5ºC)</td>
<td>250ºF (121.1ºC)</td>
</tr>
</tbody>
</table>

**Setpoint Screen #36 - Mod Heat Output Position in Off Mode**

VCBX Spts Id 101
Mod Heat Output Pos
In Off Mode: 0%

This screen can be used to ensure that a Modulating Hot Water Valve will open to a certain position when the fan is not operating in order to prevent freezing. For other forms of Modulating Heat, this would normally be set to 0%.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mod Heat Output Position in Off Mode</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Setpoint Screen #37 - Preheat Relay Setpoint**

VCBX Spts ID 101
Preheat Relay
Setpt: 30.0

For cold climates where freezing temperatures may be experienced, a Pre-Heater relay output can be activated to control a preheat coil based on the Outdoor Air Temperature to prevent freezing of Water Coils. One of the VCB-X Relay Outputs must be configured for the Pre-Heater control. When configured, any time the Outdoor Air Temperature falls below the Preheat Setpoint (during Occupied or Unoccupied Mode) and the HVAC unit’s fan is running, the Pre-Heater relay will activate.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat Setpoint</td>
<td>-30ºF (-34.4ºC)</td>
<td>30ºF (-1.1ºC)</td>
<td>70ºF (21.1ºC)</td>
</tr>
</tbody>
</table>

**Setpoint Screen #38 - Low Ambient Setpoint**

VCBX Spts ID 101
Low Ambient
Setpt: 30.0

Similar to the Pre-Heat Relay, a Low Ambient Relay can be configured to energize anytime (during Occupied or Unoccupied Mode) the Outdoor Air Temperature falls below this setpoint. The Low Ambient Relay, though, can energize whether the fan is running or not. This could be used to energize a boiler, for instance.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Ambient Setpoint</td>
<td>-30ºF (-34.4ºC)</td>
<td>30ºF (-1.1ºC)</td>
<td>70ºF (21.1ºC)</td>
</tr>
</tbody>
</table>
Setpoint Screen #39 - Heat Pump Defrost Interval

VCBX Spts ID 102
Heat Pump Defrost Interval: 30 Min

If this is a heat pump unit with a Defrost Coil Temperature Switch installed and configured, a Heat Pump Defrost Mode is available. If the Defrost Coil Temperature Switch closes during Heat Pump Heating operation, the unit will enter the Defrost Mode for 10 minutes or until the Defrost Coil Temperature Switch opens. The Heat Pump Defrost Interval is the length of time that must be met between Defrost Modes. The length of this Defrost Interval can be automatically adjusted by the Adaptive Defrost Interval Adjustment described in Setpoint Screen #40.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Pump Defrost Interval</td>
<td>10 Min</td>
<td>30 Min</td>
<td>120 Min</td>
</tr>
</tbody>
</table>

Setpoint Screen #40 - Adaptive Defrost Interval Adjustment

VCBX Spts ID 101
Adaptive Defrost Interval Adj: 0 Min

Once initiated, the Defrost Mode is active until the Defrost Coil Temperature Switch opens or until a 10 minute timer has expired. Enter a value greater than zero to enable the Adaptive Defrost Adjustment of the Heat Pump Defrost Interval (Screen #39). This adjustment value will be subtracted from the Heat Pump Defrost Interval if the Defrost Mode lasts the entire 10 minutes. A proportion of this adjustment value will be added to the Heat Pump Defrost Interval if the Defrost Mode only lasts between 8 minutes and 0 minutes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptive Defrost Adj.</td>
<td>0 Min</td>
<td>0 Min</td>
<td>30 Min</td>
</tr>
</tbody>
</table>

Setpoint Screen #41 - Heat Wheel Defrost Temperature Setpoint

VCBX Spts ID 101
Heat Wheel Defrost Temp Setpt: 30

The unit will go into Heat Wheel Defrost Mode when the Outdoor Air is below this setpoint.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Wheel Defrost</td>
<td>0°F (0°C)</td>
<td>30°F (-1.1°C)</td>
<td>50°F (10°C)</td>
</tr>
</tbody>
</table>

Setpoint Screen #42 - Morning Warm Up Temp

VCBX Spts ID 102
Morning WarmUp Max Length: 60 Min
Target Temp: 70°F

When the VCB-X is configured for VAV operation and the controller enters the Occupied Mode, the VCB-X looks at the Return Air Temperature to determine if the unit should initiate Morning Warm-up Mode. If the Return Air Temperature is below the Morning Warm-up Target Temperature and the Max Length is greater than “0,” the VCB-X controller will initiate Heating. This is considered Morning Warm-up and will run until the Return Air Temperature rises above the Morning Warm-up Target Temperature or until the Max Length Setpoint time expires.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Warm Up Max Length</td>
<td>0 Min</td>
<td>60 Min</td>
<td>240 Min</td>
</tr>
<tr>
<td>Morning Warm Up Target Temp</td>
<td>50°F (10°C)</td>
<td>70°F (21°C)</td>
<td>90°F (32.2°C)</td>
</tr>
</tbody>
</table>

Setpoint Screen #43 - Space Sensor Calibration - Current and Offset

VCBX Spts ID 101
Space Sensor Cal Current: 70.00
Offset.: 0.00

If the Space Air Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor’s Temperature. Line 3 will display the current Space Air Temperature reading. Enter a positive Sensor Calibration value in Line 4 to raise the Space Temperature Sensor reading or a negative value in Line 4 to lower the Sensor reading.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Sensor Calibration Offset</td>
<td>-100.0°F (-55.5°C)</td>
<td>0.0°F (0°C)</td>
<td>100.0°F (55.5°C)</td>
</tr>
</tbody>
</table>
### Setpoint Screen #44 - Return Air Temperature Sensor Calibration - Current and Offset

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Air Sensor Calibration Offset</td>
<td>-100.0°F (-55.5°C)</td>
<td>0.0°F (0°C)</td>
<td>100.0°F (55.5°C)</td>
</tr>
</tbody>
</table>

If the Return Air Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor’s Temperature. Line 3 will display the current Return Air Temperature reading. Enter a positive Sensor Calibration value in Line 4 to raise the Return Temperature Sensor reading or a negative value in Line 4 to lower the Sensor reading.

### Setpoint Screen #46 - Coil Sensor Calibration - Current and Offset

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Sensor Calibration Offset</td>
<td>-100.0°F (-55.5°C)</td>
<td>0.0°F (0°C)</td>
<td>100.0°F (55.5°C)</td>
</tr>
</tbody>
</table>

If the Coil Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor’s Temperature. Line 3 will display the current Coil Temperature Sensor Reading. Enter a positive Sensor Calibration value in Line 4 to raise the Coil Temperature Sensor reading or a negative value in Line 4 to lower the Sensor reading.

### Setpoint Screen #45 - SAT Sensor Calibration - Current and Offset

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT Sensor Calibration</td>
<td>-100.0°F (-55.5°C)</td>
<td>0.0°F (0°C)</td>
<td>100.0°F (55.5°C)</td>
</tr>
</tbody>
</table>

If the Supply Air Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor’s Temperature. Line 3 will display the current Supply Air Temperature Sensor reading. Enter a positive Sensor Calibration value in Line 4 to raise the Supply Air Temperature Sensor reading or a negative value in Line 4 to lower the Sensor reading.

### Setpoint Screen #47 - OAT Sensor Calibration - Current and Offset

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAT Sensor Calibration</td>
<td>-100.0°F (-55.5°C)</td>
<td>0.0°F (0°C)</td>
<td>100.0°F (55.5°C)</td>
</tr>
</tbody>
</table>

If the Outdoor Air Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor’s Temperature. Line 3 will display the current Outdoor Air Temperature Sensor Reading. Enter a positive Sensor Calibration value in Line 4 to raise the Outdoor Air Temperature Sensor reading or a negative value in Line 4 to lower the Sensor reading.

### Setpoint Screen #48 - CO₂ Sensor Calibration - Current and Offset

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Calibration CO₂</td>
<td>-500.0 PPM</td>
<td>0.0 PPM</td>
<td>500.0 PPM</td>
</tr>
</tbody>
</table>

If the CO₂ Sensor is reading incorrectly, you can use this option to enter an offset reading to adjust the Sensor’s Sensitivity. Line 3 will display the current CO₂ Sensor reading. Enter a positive Sensor Calibration value in Line 4 to increase the CO₂ Sensor reading or a negative value in Line 4 to lower the Sensor reading.
Status
The VCB-X Controller Status Screens are accessed by pressing the <STATUS> button on the Modular Service Tool. Following are the available status screens and a description of their functions:

Status Screen 1 - Date and Time

Line 2 Controller Date/Time
Line 3 MM/DD/YY HH:MM XX
(Month, Day, Year) (Hour, Minutes, AM or PM)

Status Screen 2 - Application Type, Schedule Mode & HVAC Mode

Line 2 App Type:
Constant Volume Single Zone VAV
VAV VAV w/Tempering (not available at this time)
Make Up Air

Line 3 Schedule Mode:
Unoccupied Holiday Occupied
Occupied Forced Occupied
Override Forced Unoccupied
Holiday Unoccupied Remote Occupied

Line 4 HVAC Mode:
Off Dehum Vent
Vent Mode Dehum Cool
Cool Mode Dehum Heat
Heat Mode Warm Up
Defrost

Status Screen 3 - Controlling Temperature, Cooling & Heating Setpoints

VCB-X v2.00 ID 101
Cont. Temp: XX.XX
Cool Spt.: XX.XX
Heat Spt.: XX.XX

Line 2 Controlling Temperature
This is the temperature of the sensor that is configured as the HVAC Source (Mode Enable) Sensor. This can be the Supply Air, Return Air, Outdoor Air, or Space Temperature Sensor.

Line 3 Cooling Setpoint
Based on the current Occupied/Unoccupied Mode of operation. (Reflects any active resets.)

Line 4 Heating Setpoint
Based on the current Occupied/Unoccupied Mode of operation. (Reflects any active resets.)

Status Screen 4 - Space and Return Temperature & Slide Adjust

VCB-X v2.00 ID 101
Space Tmp.: XXX.XX
Return Tmp.: XXX.XX
Slide Adj.: XXX.XX

Line 2 Space Temperature
If you are using a Space Temperature Sensor, this line will display the current Space Temperature during the Occupied or Unoccupied Mode. If a Space Temperature Sensor is not used, it will display 0°F.

Line 3 Return Air Temperature
If you are using a Return Air Temperature Sensor, this line will display the current Return Air Temperature during the Occupied or Unoccupied Mode. If a Return Air Temperature Sensor is not used, it will display 0°F.

Line 4 Slide Adjust
This is the current value of the Space Temperature offset based on the position of the slide adjust switch on the Space Sensor.
**Programming**

**VCB-X Status Screens**

**Status Screen 5 - Supply Air Temperature & Active Setpoint**

Line 2

Current Supply Air Temperature

The Supply Air Temperature is always required. If a Supply Air Temperature Sensor is not installed, the VCB-X Controller will not operate correctly and will display 0°F.

Line 3

Current Active Supply Air Setpoint

This is the Supply Air Setpoint for the mode that the unit is currently operating in. If the Supply Air Reset is configured, this is the calculated setpoint based on the current Reset Source conditions.

**Status Screen 6 - Cooling Enabled**

Line 2

Cooling Active Stages

This line will display the number of stages of Cooling that are currently active.

Line 3

Current Modulating Cooling Output Signal Percentage

Indicates the percentage output signal to the Digital Scroll Compressor.

**Status Screen 8 - Compressor Discharge Temperature**

Line 3

Compressor Discharge Temperature

This line will display the current compressor discharge temperature if your HVAC unit is using a Digital Scroll Compressor. If this temperature rises above 268°F (131.11°C), the digital compressor will be locked out.

**Status Screen 9 - Heating Enabled**

If this is not a Heat Pump unit, the screen will appear as shown above.

Line 3

Heating Enabled YES/NO

This line will display YES if Heating is enabled and No if Heating is not enabled. Heating is enabled if the Outdoor Air Temperature is below the Heating Lockout.

**Status Screen 7 - Cooling Outputs - Active Stages and Mod Cool Position**

Line 2

Cooling Outputs

Active Stages: XX

Mod Cool Pos.: XXX%

Line 3

Current Modulating Cooling Output Signal Percentage

Indicates the percentage output signal to the Digital Scroll Compressor.
Status Screen 10 - Heating Outputs - Active Stages and Mod Heat Position

VCB-X v2.00 ID 101
Heating Outputs
Active Stages: XX
Mod Heat Pos.: XXX%

If this is not a Heat Pump unit, the screen above will be shown.

Line 3 Heating Active Stages
This line will display the number of stages of Heating that are currently active.

Line 4 Current Modulating Heating Output Signal Percentage
Indicates the percentage output signal being supplied to a Modulating Heating device when you have configured this option for your HVAC unit.

Status Screen 11 - MODGAS-X Enabled and Output %

VCB-X v2.00 ID 101
MODGAS-X
Enabled...: YES/NO
Position...: XXX%

Line 3 MODGAS-X Enabled or Disabled
This indicates whether the VCB-X Controller has enabled the MODGAS-X Controller to begin to operate. If you do not have a MODGAS-X Controller connected to the VCB-X Controller, this line will indicate “NO”.

Line 4 Current MODGAS-X Heating Output Signal
Indicates the percentage output signal being supplied to the MODGAS-X controller when you have one connected to the VCB-X Controller.

Status Screen 12 - Indoor RH & Indoor RH Setpoint

VCB-X v2.00 ID 101
Indoor RH: XXX.X%
RH Spt: XXX.X%

Line 2 Current Indoor Relative Humidity Percentage
If an E-Bus Space Temperature/Humidity Sensor has been installed and configured on the unit, the current Indoor Air Relative Humidity Percentage will appear on this line. If this combination Temperature/Humidity Sensor is not installed, this line will display 0%.

Line 3 Current Indoor Relative Humidity Setpoint Percentage
This is the adjustable Indoor Air Relative Humidity Setpoint Percentage that has been set by the user.

Status Screen 13 - Coil Temp & Setpoint & Suction Pressure

VCB-X v2.00 ID 101
Coil Temp: XXX.X
Coil Setpt: XXX.X
Suction Pr: XXX PSI

Line 2 Coil Temperature
If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.

Line 3 Coil Temperature Setpoint
During DX dehumidification, compressor(s) will be staged/ modulated to maintain this Coil Suction Temperature Setpoint. If indoor humidity reset of the Coil Setpoint has been configured, this will be the current calculated setpoint.

Line 4 Suction Pressure
This is the current Suction Pressure.
**Programming**

**VCB-X Status Screens**

**Status Screen 14 - Active Reheat Stages**

VCB-X v2.00 ID 101
Active Reheat Stages: X

Line 3  Active Reheat Stages
This screen is not currently used.

**Status Screen 15 - MHGRV-X Enabled and Output %**

VCB-X v2.00 ID 101
MHGRV-X Enabled: YES/NO
Position: XXX%

Line 3  MHGRV-X Enabled or Disabled
This indicates whether the VCB-X Controller has enabled the MHGRV-X Controller to begin to operate. If you do not have a MHGRV-X Controller connected to the VCB-X Controller, this line will indicate “NO”.

Line 4  Current MHGRV-X Reheat Valve Output Signal Percentage
Indicates the percentage output signal being supplied to the MHGRV-X Controller when you have one connected to the VCB-X Controller.

**Status Screen 16 - OA Drybulb and Humidity**

VCB-X v2.00 ID 101
Outdoor Conditions
Drybulb: XXX.XX
Humidity: XXX%

Line 3  Current Outdoor Air Drybulb
If an E-BUS Outdoor Air Temperature/Humidity Sensor has been installed and configured on the VCB-X, the current Outdoor Air Temperature will display on this line. If the sensor fails, this line will display a temperature that is half way between the Cooling and Heating Lockout Setpoints.

Line 4  Current Outdoor Air Relative Humidity
If an E-BUS Outdoor Air Temperature/Humidity Sensor has been installed and configured on the VCB-X, the Outdoor Air Relative Humidity Percentage will appear on this line. If not, this line will display 0%.

**Status Screen 17 - OA Wetbulb and Dewpoint**

VCB-X v2.00 ID 101
Outdoor Conditions
Wetbulb: XXX.XX
Dewpoint: XXX.XX

Line 3  Current Wetbulb Temperature
If an E-BUS Outdoor Air Temperature/Humidity Sensor has been installed and configured on the unit, this line will display the calculated Outdoor Air Wetbulb Temperature. If these conditions do not exist, it will display 0°F.

Line 4  Current Calculated Outdoor Air Dewpoint Temperature
If an E-BUS Outdoor Air Temperature/Humidity Sensor has been installed and configured on the unit, the calculated Outdoor Air Dewpoint Temperature will appear on this line. If not, this screen displays 0°F.

**Status Screen 18 - Economizer Enabled and Economizer Position**

VCB-X v2.00 ID 101
Economizer Enabled: YES/NO
Position: XXX%

Line 3  Economizer Enabled
This line will display YES if the Economizer is enabled and NO if the Economizer is not enabled. The Economizer is enabled whenever the Economizer Enable Temperature (options: Drybulb, Wetbulb or Dewpoint) is below the Economizer Enable Setpoint.

Line 4  Current Economizer Open Percentage
This shows the Outdoor Air Damper open percentage, whether the unit is configured for Economizer Control or simply has a Minimum Outdoor Air Damper position configured. If Economizer Control is not configured, it will display 0%.
**Status Screen 19 - Economizer in IAQ Mode and Minimum Economizer Position**

VCB-X v2.00 ID 101  
Econo in IAQ Mode  
YES/NO  
Econo Min Pos: XXX%

**Line 3**  Economizer in IAQ Mode  
This line will display YES if the Economizer (OA) Minimum Damper Position has been overridden based on CO\textsubscript{2} IAQ operation.

**Line 4**  Economizer Minimum Percentage  
This shows the current Economizer (OA) Minimum Damper Position. If the unit is not in IAQ Mode, this will be the regular configured Minimum Damper Position. If the unit is in IAQ Mode, this will show the re-calculated Minimum Damper Position.

**Status Screen 20 - CO\textsubscript{2} Level and Setpoints**

VCB-X v2.00 ID 101  
Co2 Level: XXXX PPM  
Min Setpt: XXXX PPM  
Max Setpt: XXXX PPM

**Line 2**  Current CO\textsubscript{2} Level  
Indicates the CO\textsubscript{2} Level. You must install and configure a CO\textsubscript{2} Sensor to display the CO\textsubscript{2} Level. If a CO\textsubscript{2} Sensor is not installed and configured, this line will display 0 PPM.

**Line 3**  Minimum CO\textsubscript{2} Setpoint  
This is the Minimum CO\textsubscript{2} Setpoint that was configured in Setpoint Screen #29.

**Line 4**  Maximum CO\textsubscript{2} Setpoint  
This is the Maximum CO\textsubscript{2} Setpoint that was configured in Setpoint Screen #29.

**Status Screen 21 - Outdoor Air CFM & Supply Air CFM**

VCB-X v2.00 ID 101  
Outdoor kCFM: XXX.XX  
Supply kCFM: XXX.XX

**Line 2**  Outdoor Air CFM  
If an Outdoor Air airflow monitoring station is being used, this is the current CFM reading of that device. K = 1000

**Line 3**  Supply Air CFM  
If a Supply Air airflow monitoring station is being used, this is the current CFM reading of that device. K = 1000

**Status Screen 22 - Return Air CFM & Exhaust Air CFM**

VCB-X v2.00 ID 101  
Return kCFM: XXX.XX  
Exhaust kCFM: XXX.XX

**Line 2**  Return Air CFM  
If a Return Air airflow monitoring station is being used, this is the current CFM reading of that device. K = 1000

**Line 3**  Exhaust Air CFM  
If an Exhaust Air airflow monitoring station is being used, this is the current CFM reading of that device. K = 1000
Programming

VCB-X Status Screens

Status Screen 23 - Duct Static Pressure Setpoint & Output %

VCB-X v2.00 ID 101
Static Pr: X.XX in
Setpt: X.XX in
Output: XXX%

Line 2  Current Duct Static Pressure
Requires the installation and wiring of a Duct Static Pressure Sensor. If you do not have a Duct Static Pressure Sensor correctly installed and wired to the controller, this line will display “0.0”.

Line 3  Duct Static Pressure Setpoint
This is the Duct Static Pressure Setpoint configured in Setpoint Screen #12.

Line 4  Current Duct Static Pressure Output Signal Percentage
Indicates the output signal percentage being supplied to the VFD Supply Fan or Bypass Damper Actuator when you have configured one of these options for your HVAC unit.

If you have not configured Duct Static Pressure Control, this line will display [No Press Out Conf].

Status Screen 24 - Building Pressure & Setpoint

VCB-X v2.00 ID 101
Building Pressure
Pressure: XXX in
Setpt: X.XX in

Line 3  Current Building Pressure
Indicates the current Building Pressure. This display requires the installation of a Building Pressure Sensor.

If you don’t have a Building Pressure Sensor correctly installed and wired to the controller, this line will display “0.0”.

Line 4  Building Pressure Setpoint
This is the Building Static Pressure Setpoint configured in Setpoint Screen #31.

If you have not configured Building Pressure Control, this line will display [No Press Out Conf].

Status Screen 25 - Building Pressure Exhaust Fan and Output %

VCB-X v2.00 ID 101
Building Pressure Exhaust Fan: ON/OFF
Output: XXX%

Line 3  Building Pressure Exhaust Fan Status
Indicates whether the Exhaust Fan Relay is On or Off.

Line 4  Current Building Pressure Output Signal Percentage
Indicates the output signal percentage being supplied to the building pressure control fan or damper. For Direct Acting control, this would be to an Exhaust Fan VFD or a Modulating Exhaust Damper. For Reverse Acting control, this would be to the Outdoor Air Damper.

If you have not configured Building Pressure Control, this line will display [No Press Out Conf].

Status Screen 26 - Head Pressure Setpoint and Condenser Fan Signal

VCB-X v2.00 ID 101
Head Pr: XXX PSI
Setpt: XXX PSI
Cond.Signal: XXX%

Line 2  Head Pressure
If a Head Pressure Transducer is connected to the VCB-X EM1 Module, this line indicates the current Head Pressure Reading.

Line 3  Head Pressure Setpoint
This line indicates the current Head Pressure Setpoint.

Line 4  Condenser Signal
This indicates the current percentage signal being sent to the Condenser Fan or Valve in order to maintain the Head Pressure Setpoint.
Status Screen 27 - Leaving Water Temperature, Entering Water Temperature & Suction Pressure

VCB-X v2.00 ID 101
Lvg H2O Tmp: XXX.XX
Ent H2O Tmp: XXX.XX
Suction Pr: XXX PSI

Line 2  Leaving Water Temperature
If you are using a Water Side Condenser and have a Leaving Water Temperature Sensor connected to the EM1 Module, this line displays the Leaving Water Temperature of the unit.

Line 3  Entering Water Temperature
If you are using a Water Side Condenser and have an Entering Water Temperature Sensor connected to the EM1 Module, this line displays the Entering Water Temperature of the unit.

Line 4  Suction Pressure
This is the current Suction Pressure.


VCB-X v2.00 ID 101
WSHP Spts XX% Glycol
Ht Mode Lo Suct: XXX
Cl Mode Lo Suct: XXX

If this unit has a Water Source Heat Pump Module, these values are read directly from hard-coded information in that module. The values on Lines 3 and 4 are safety setpoints that will disable compressors. See the Water Source Heat Pump Module Technical Guide for further details about these safeties.

Line 2  WSHP Glycol Percentage
This line displays the percentage of glycol that the Water Source Heat Pump module is currently using.

Line 3  Heating Mode Low Suction Setpoint
This is the Heating Mode Low Suction Setpoint.

Line 4  Cooling Mode Low Suction Setpoint
This is the Cooling Mode Low Suction Setpoint.

Status Screen 29 - Water Source Heat Pump Module Setpoints - Unsafe Suction and Leaving Water Temperature

VCB-X v2.00 ID 101
WSHP Spts XX% Glycol
Unsafe Suction: XXX
Lo Lvg H2O Tmp: XXX

If this unit has a Water Source Heat Pump Module, these values are read directly from hard-coded information in that module. The values on Lines 3 and 4 are safety setpoints that will disable compressors. See the Water Source Heat Pump Module Technical Guide for further details about these safeties.

Line 2  WSHP Glycol Percentage
This line displays the percentage of glycol that the Water Source Heat Pump module is currently using.

Line 3  Unsafe Suction Setpoint
This is the Unsafe Suction Setpoint.

Line 4  Low Leaving Water Temperature
This is the Low Leaving Water Temperature Setpoint.
### VCB-X Status Screens

#### Status Screens 30-35 - VCB-X Relays

<table>
<thead>
<tr>
<th>Line 2</th>
<th>On Board Relays 1-6 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 3</td>
<td>Current description of what this Relay is configured for</td>
</tr>
<tr>
<td></td>
<td>On screen 30, this line will display FAN.</td>
</tr>
<tr>
<td></td>
<td>On screens 31-35, this line will indicate the relay’s use.</td>
</tr>
<tr>
<td></td>
<td>Possible options are:</td>
</tr>
<tr>
<td></td>
<td>Not Used (Default)</td>
</tr>
<tr>
<td></td>
<td>Digital Comp</td>
</tr>
<tr>
<td></td>
<td>Cool Stage</td>
</tr>
<tr>
<td></td>
<td>Heat Stage</td>
</tr>
<tr>
<td></td>
<td>Condenser</td>
</tr>
<tr>
<td></td>
<td>Heat Pump Compressor</td>
</tr>
<tr>
<td></td>
<td>Reversing Valve</td>
</tr>
<tr>
<td></td>
<td>Aux Heat</td>
</tr>
<tr>
<td></td>
<td>Emergency Heat</td>
</tr>
<tr>
<td></td>
<td>Mod Heat Enable</td>
</tr>
<tr>
<td></td>
<td>Alarm Active</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 4</th>
<th>Current Relay Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This line will display the ON/OFF condition for that relay.</td>
</tr>
<tr>
<td></td>
<td>FORCED ON or FORCED OFF will appear if this Relay is in a Force Mode.</td>
</tr>
<tr>
<td></td>
<td>Possible options are as follows:</td>
</tr>
<tr>
<td></td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>FORCED ON</td>
</tr>
</tbody>
</table>

#### Status Screens 36-40 - EM1 Relays

<table>
<thead>
<tr>
<th>Line 2</th>
<th>On Board Relays 1-5 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 3</td>
<td>Current description of what this Relay is configured for</td>
</tr>
<tr>
<td></td>
<td>On screens 36-40, this line will indicate the relay’s use.</td>
</tr>
<tr>
<td></td>
<td>Possible options are:</td>
</tr>
<tr>
<td></td>
<td>Not Used (Default)</td>
</tr>
<tr>
<td></td>
<td>Digital Comp</td>
</tr>
<tr>
<td></td>
<td>Cool Stage</td>
</tr>
<tr>
<td></td>
<td>Heat Stage</td>
</tr>
<tr>
<td></td>
<td>Condenser</td>
</tr>
<tr>
<td></td>
<td>Heat Pump Compressor</td>
</tr>
<tr>
<td></td>
<td>Reversing Valve</td>
</tr>
<tr>
<td></td>
<td>Aux Heat</td>
</tr>
<tr>
<td></td>
<td>Emergency Heat</td>
</tr>
<tr>
<td></td>
<td>Mod Heat Enable</td>
</tr>
<tr>
<td></td>
<td>Alarm Active</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 4</th>
<th>Current Relay Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This line will display the ON/OFF condition for that relay.</td>
</tr>
<tr>
<td></td>
<td>FORCED ON or FORCED OFF will appear if this Relay is in a Force Mode.</td>
</tr>
<tr>
<td></td>
<td>Possible options are as follows:</td>
</tr>
<tr>
<td></td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>FORCED ON</td>
</tr>
</tbody>
</table>
Status Screens 41-52 - 12 Relay Expansion Module Relays

<table>
<thead>
<tr>
<th>Line 2</th>
<th>On Board Relays 1-12 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 3</td>
<td>Current description of what this Relay is configured for</td>
</tr>
<tr>
<td></td>
<td>On screens 41-52, this line will indicate the relay’s use. Possible options are:</td>
</tr>
<tr>
<td></td>
<td>Not Used (Default)</td>
</tr>
<tr>
<td></td>
<td>Digital Comp</td>
</tr>
<tr>
<td></td>
<td>Cool Stage</td>
</tr>
<tr>
<td></td>
<td>Heat Stage</td>
</tr>
<tr>
<td></td>
<td>Condenser</td>
</tr>
<tr>
<td></td>
<td>Heat Pump Compressor</td>
</tr>
<tr>
<td></td>
<td>Reversing Valve</td>
</tr>
<tr>
<td></td>
<td>Aux Heat</td>
</tr>
<tr>
<td></td>
<td>Emergency Heat</td>
</tr>
<tr>
<td></td>
<td>Mod Heat Enable</td>
</tr>
<tr>
<td></td>
<td>Alarm Active</td>
</tr>
<tr>
<td></td>
<td>Mod Cool Enable</td>
</tr>
<tr>
<td></td>
<td>Warm Up Command</td>
</tr>
<tr>
<td></td>
<td>Reheat Stage</td>
</tr>
<tr>
<td></td>
<td>Preheat</td>
</tr>
<tr>
<td></td>
<td>Low Ambient</td>
</tr>
<tr>
<td></td>
<td>Exhaust Fan</td>
</tr>
<tr>
<td></td>
<td>Economizer Active</td>
</tr>
<tr>
<td></td>
<td>Heat Wheel</td>
</tr>
<tr>
<td></td>
<td>Occupied Active</td>
</tr>
<tr>
<td></td>
<td>Override Active</td>
</tr>
</tbody>
</table>

Line 4 Current Relay Status
This line will display the ON/OFF condition for that relay. FORCED ON or FORCED OFF will appear if this Relay is in a Force Mode. Possible options are as follows:
ON     OFF
FORCED ON  FORCED OFF

Status Screens 53 - 83 - Alarm Status

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Alarm Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 3</td>
<td>Alarm Conditions</td>
</tr>
<tr>
<td></td>
<td>Can be one of the following:</td>
</tr>
<tr>
<td></td>
<td>Bad SAT Sensor</td>
</tr>
<tr>
<td></td>
<td>Bad OAT Sensor</td>
</tr>
<tr>
<td></td>
<td>Bad Space Sensor</td>
</tr>
<tr>
<td></td>
<td>Missing Main Exp Board</td>
</tr>
<tr>
<td></td>
<td>Missing Coil Sensor</td>
</tr>
<tr>
<td></td>
<td>Missing Co2 Sensor</td>
</tr>
<tr>
<td></td>
<td>Bad Compressor Discharge Sensor</td>
</tr>
<tr>
<td></td>
<td>Missing Outdoor Airflow Sensor</td>
</tr>
<tr>
<td></td>
<td>Missing Exhaust Airflow Sensor</td>
</tr>
<tr>
<td></td>
<td>Missing Supply Air Airflow Sensor</td>
</tr>
<tr>
<td></td>
<td>Missing Return Air Airflow Sensor</td>
</tr>
<tr>
<td></td>
<td>Missing MHGRV-X Board</td>
</tr>
<tr>
<td></td>
<td>Missing MODGAS-X Board</td>
</tr>
<tr>
<td></td>
<td>Missing 12RLY Board</td>
</tr>
<tr>
<td></td>
<td>Mech Cooling Failure</td>
</tr>
<tr>
<td></td>
<td>Mech Heating Failure</td>
</tr>
<tr>
<td></td>
<td>Fan Proving Alarm</td>
</tr>
<tr>
<td></td>
<td>Dirty Filter Alarm</td>
</tr>
<tr>
<td></td>
<td>Emergency Shutdown</td>
</tr>
<tr>
<td></td>
<td>High Supply Air Temperature Cutoff</td>
</tr>
<tr>
<td></td>
<td>Low Supply Air Temperature Cutoff</td>
</tr>
<tr>
<td></td>
<td>High Control Temp</td>
</tr>
<tr>
<td></td>
<td>Low Control Temp</td>
</tr>
<tr>
<td></td>
<td>Digital Compressor Cutoff</td>
</tr>
<tr>
<td></td>
<td>Digital Compressor Lockout</td>
</tr>
<tr>
<td></td>
<td>High Head Pressure</td>
</tr>
<tr>
<td></td>
<td>WSHP Proof of Flow Failure</td>
</tr>
<tr>
<td></td>
<td>Low Suction Pressure</td>
</tr>
<tr>
<td></td>
<td>Unsafe Suction Pressure</td>
</tr>
<tr>
<td></td>
<td>WSHP Low Water Temperature</td>
</tr>
</tbody>
</table>

If you press <Enter>, the screen will scroll through all active alarms.

For Alarm Definitions, see the VCB-X Controller Field Technical Guide.
Programming

VAV/Zone Configuration Screens

VAV/Zone Configuration

In order to correctly set up the VAV/Zone Controller, you must first configure several parameters in regard to the type of system and operating parameters for the VAV/Zone Controller you have installed. Most of these values and operating parameters are only set once at the initial system setup and are never changed.

System Manager Instructions

From any Menu Screen, press the <Setpoints> button. The Unit Selection Screen will appear requesting that you enter the unit ID number. Enter the correct unit ID number of the VAV/Zone Controller you want to configure and press <Enter>. You will see the screen shown below.

Press <2> on the keypad to enter the first Unit Configuration Screen.

Modular Service Tool Instructions

From any Menu Screen, press the <Configuration> button. The Unit Selection Screen will appear requesting that you enter the unit ID number. Enter the correct unit ID number of the VAV/Zone Controller you want to configure, and press <Enter>. You will then see Unit Configuration Screen #1.

1) Change Setpoint
2) Configure Unit
3) Damper Force
ESC) Exit Menu

Press <2> on the keypad to enter the first Unit Configuration Screen.

Configuration Screen #1 - Box Configuration

XX Box Cnfg IDXXXX
Box Configuration
COOLING ONLY BOX
[Enter Type 0 - 3]

This Box Control Code will operate in one of four possible modes. The box designation will display on the top line of all screens.

0 = COOLING ONLY BOX (will display as CO Box)
1 = H/C CHANGEOVER BOX (will display as HC Box)
2 = SERIES FAN BOX (will display as SF Box)
3 = PARALLEL FAN BOX (will display as PF Box)

Configuration Screen #2 - Damper Operation

XX Box Cnfg IDXXXX
Damper Operating Mode: DIRECT ACTING
[0=Direct 1=Reverse]

Enter <0> for Direct Acting or <1> for Reverse Acting. If the damper opens in a clockwise direction, it is DIRECT ACTING. If the damper opens in a counter-clockwise direction, it is REVERSE ACTING.

CAUTION: If you change this setting, you MUST cycle power to the controller to allow it to re-calibrate the damper feedback positions for its new direction of control!

Configuration Screen #3 - Voting Zone

XX Box Cnfg IDXXXX
Is This Box a Voting Zone..: YES
[0=NO 1=YES]

If this is a Zoned System, select this option so that the box can be included as a voting zone.

Configuration Screen #4 - Pressure Independent Airflow Constant

XX Box Cnfg IDXXXX
Pr Independent Boxes Airflow @ 1” WG Constant..: 1200 CFM

If this is a Pressure Independent Box, you must enter this airflow constant so that the CFM readings can be correctly calculated. This airflow constant is provided by the box manufacturer and depends on the diameter of the duct.
If you require the VAV/Zone Controller to control reheat for the zone it is installed in, you must include a relay expansion board and then configure the number of heating stages (1, 2, or 3) that it will be controlling whenever there is a heating demand in the space. Enter <0> if you don’t require this option.

Select this option to change the range of the proportional heat output from 0-10 VDC to 2-10 VDC.

Set this option to 1 = YES to allow the Heating Relay’s Controlling Box Heat to remain on even when the HVAC unit is in Supply Air Heating Mode. This is used as a method to provide supplemental heat if for some reason the HVAC heat cannot satisfy the heating demand.

This setting only applies to the unoccupied mode of operation. Select 1=YES to activate the heating stages only when the main fan is operating on non-fan terminal units. For series fan terminal units, if this setting is set to 1=YES, the series box fan will only run when the main HVAC unit fan is running or when a space heating demand is made. For series fan terminal units, if this setting is set to 0=NO, the series box fan will only run when a space heating demand is made. This setting has no effect on the parallel flow fan terminal unit.

During Unoccupied Mode, all zones with a corresponding Group ID # will resume Occupied operation whenever any of the zones in that group has its push-button depressed to initiate an override condition. This allows you to group zones in various areas of the building. For example, individual tenants with several offices could restore occupied mode for just their zones and not affect other zones in the building.

The default group ID number for all VAV/Zone Controllers is set at the factory to 1. If you don’t want a specific zone(s) to be part of that group, you must give each one a distinct Group ID number between 2 and 16. Setting a zone’s Group ID number to 0 will disable the Space Sensor Override Button function.

A “Dump Zone” is used when you want to control a duct heater or baseboard heater independently. A VAV/Zone Controller board with a relay expansion board is used for this purpose. No damper or actuator is used. If you need to control an auxiliary heater, select 1=YES; otherwise, be sure it is set to 0=NO.

If this system has 1 HVAC unit controlling boxes on multiple loops and the HVAC unit is on a different loop than this box, select 1=YES; otherwise, be sure it is set to 0=NO.
Programming

VAV/Zone Setpoint Screens

VAV/Zone Controller Setpoints

Setpoint Screen #1 - Occupied Setpoints

Enter the Occupied Cooling Setpoint as the maximum temperature you would like the zone to reach before modulating the damper open to bring in more cold air to cool the space. Enter the Occupied Heating Setpoint as the minimum temperature you would like the zone to reach before activating the Reheat Stages on the optional Expansion Relay board. If this is a Cooling Only box that doesn’t contain reheat, this setpoint will be ignored.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Setpoint</td>
<td>50°F</td>
<td>74°F</td>
<td>90°F</td>
</tr>
<tr>
<td>Heating Setpoint</td>
<td>50°F</td>
<td>70°F</td>
<td>90°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #2 - Unoccupied Setbacks

During unoccupied hours, the Occupied Cooling Setpoint is adjusted up by the amount entered for the Cooling SetUp. The Occupied Heating Setpoint is adjusted down by the amount entered for the Heating SetBk.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling SetUp</td>
<td>0°F</td>
<td>+10°F</td>
<td>+30°F</td>
</tr>
<tr>
<td>Heating SetBk</td>
<td>0°F</td>
<td>-10°F</td>
<td>-30°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #3 - AHU Heat Call Space Temp

This setpoint allows you to set a Space Temperature that will cause the VAV/Zone Controller to send a call for heat to the HVAC unit. This only occurs in the Unoccupied Mode.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHU Heat Call Space Temp</td>
<td>50°F</td>
<td>70°F</td>
<td>90°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #4 - Auxiliary Heat Setpoint

This setpoint allows you to set a Space Temperature that will enable the Auxiliary Heat Relay (Relay 4) on the VAV/Zone Controller Reheat Expansion Board for heating options other than box heat, such as baseboard heat or an external duct heater. This could control a stage of electric heat or an on/off hot water valve. The Auxiliary Heat Relay will energize at .5°F below this setpoint and will de-energize at .5°F above this setpoint. The Auxiliary Heat will continue to function regardless of the HVAC Mode the unit is in and at any airflow condition.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary Heat Setpoint</td>
<td>50°F</td>
<td>70°F</td>
<td>90°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #5 - Damper Airflow Integral

The VAV/Zone Controller normally opens its damper based on a Proportional Error from Setpoint. That means if the zone temperature is 4°F from setpoint, the damper would be 100% open, or it would be modulating to provide the Maximum CFM on Pressure Independent boxes. If the error is less than 4°F, the damper may stagnate at that position and never satisfy the zone. If you add Integral into the damper calculation process, this will cause the damper or airflow calculations to continue to increase as long as the zone temperature is still above the setpoint. That means it can provide 100% or Maximum CFM before the 4°F error is achieved, bringing the zone under control faster than it normally would. Start with a small (5 or 10) value, if you use this, and monitor the effect it has. If you enter too large a value, you can create “hunting” situations that can cause the damper actuator to prematurely wear out.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integral</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

Revised 11/3/11
The VAV/Zone Controller will not allow the damper or airflow calculation to exceed the Maximum setpoint while it is allowing the damper to modulate. During Vent mode when there is no heating or cooling demand, the damper or airflow will maintain at least the Vent Min amount of airflow into the zone for ventilation.

### Setpoint Screen #6 - Damper Airflow Max & Vent Min

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>0% or 0 CFM</td>
<td>100% or 1000 CFM</td>
<td>100% or 30000 CFM</td>
</tr>
<tr>
<td>Vent Min.</td>
<td>0% or 0 CFM</td>
<td>25% or 250 CFM</td>
<td>100% or 30000 CFM</td>
</tr>
</tbody>
</table>

The Night Min is the position the damper will move to when the system is in Override Mode and this particular damper is not part of the override group. This Night Min position only affects non-fan powered boxes. The Fan On Min is the minimum damper or airflow setting used to activate the parallel fan if installed. Pressure Independent = CFM. Pressure Dependent = %.

### Setpoint Screen #8 - Damper Airflow Night Min and Fan On Min

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night Min.</td>
<td>0% or 0 CFM</td>
<td>0% or 0 CFM</td>
<td>100% or 9999 CFM</td>
</tr>
<tr>
<td>Fan On Min.</td>
<td>0% or 0 CFM</td>
<td>25% or 250 CFM</td>
<td>100% or 9999 CFM</td>
</tr>
</tbody>
</table>

During Supply Air Cooling Mode, if the space being served by this damper is satisfied and has no cooling demand, the damper will close to this Cool Min setting. This provides a minimum amount of airflow into the space for ventilation, even if the space does not require additional cooling. During Supply Air Heating Mode, if the space being served by this damper is satisfied and has no heating demand, the damper will close to this Heat Min setting. This provides a minimum amount of airflow into the space for ventilation, even if the space does not require additional heating.

### Setpoint Screen #9 - Damper Airflow Reheat Min

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reheat Min.</td>
<td>0% or 0 CFM</td>
<td>100% or 30000 CFM</td>
<td></td>
</tr>
</tbody>
</table>

The Reheat Min is the damper or airflow setting used during the Space Reheat Mode of operation.

### Setpoint Screen #10 - Damper Airflow Fixed Position

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Pos.</td>
<td>0% or 0 CFM</td>
<td>0% or 0 CFM</td>
<td>100% or 9999 CFM</td>
</tr>
</tbody>
</table>

Many times while troubleshooting a system, it is useful to have the zone damper set to a specific damper position or airflow setting. This setpoint can be used to determine where the damper/airflow will remain when the VAV/Zone Controller receives a Force to Fixed Position command.
If the supply air temperature is above the space temperature by this amount, the VAV/Zone controller enters the Supply Air Heating Mode. It will remain in the Supply Air Heating Mode until the supply air drops to 2ºF above the space temperature. At that point the unit enters the Supply Air Vent Mode and remains there until the supply air drops this deadband below the space temperature. At that point the VAV/Zone Controller enters the Supply Air Cooling Mode and will remain there until the supply air temperature rises to 2ºF below the space temperature.

### Setpoint Screen #11 - SAT HVAC Mode

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT HVAC Mode Deadband</td>
<td>0ºF</td>
<td>10ºF</td>
<td>20ºF</td>
</tr>
</tbody>
</table>

### Setpoint Screen #12 - Zone Alarm Offsets

The VAV/Zone Controller can be setup to generate an alarm anytime the box goes into the Occupied Mode and the Zone Temperature exceeds the user-defined alarm limits for a user-defined period of time. A High Temperature Alarm Setpoint is created by adding the Hi Zone Alarm offset to the current Cooling Setpoint. The Low Temperature Alarm Setpoint is created by adding the Lo Zone Alarm offset to the current Heating Setpoint. If the zone temperature exceeds either of these limits for a period defined by the Alarm Delay setpoint, the controller can generate an alarm callout if all the optional hardware components required for this to occur are installed.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hi Zone Alarm</td>
<td>+1ºF</td>
<td>+30ºF</td>
<td>+50ºF</td>
</tr>
<tr>
<td>Lo Zone Alarm</td>
<td>-1ºF</td>
<td>-30ºF</td>
<td>-50ºF</td>
</tr>
</tbody>
</table>

As mentioned above, if you configure the controller to generate zone temperature alarms, this is the amount of time after the box goes into the Occupied Mode that the temperature must be outside the alarm limits before an alarm is generated.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of Limits</td>
<td>1 Min</td>
<td>30 Min</td>
<td>300 Min</td>
</tr>
</tbody>
</table>

### Setpoint Screen #13 - Zone Alarm Delay

This screen allows you to set the VAV/Zone controller to operate on a remote schedule instead of the schedule that is contained in the VCM-X controller. Enter <0> to operate on the AHU schedule. Enter <1-5> to use an external schedule. A GPC Plus is required for schedules 1-5.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule Control Number</td>
<td>0</td>
<td>0</td>
<td>1 to 5</td>
</tr>
</tbody>
</table>

### Setpoint Screen #14 - Day/Night Schedule

If the Flush Mount Wall Sensor has the optional Setpoint Slide Adjust, this is the maximum amount you can adjust the heating and cooling setpoints up or down as the slide is moved from the center position to its full up or down position.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect on SP</td>
<td>0ºF</td>
<td>0ºF</td>
<td>6ºF</td>
</tr>
</tbody>
</table>
If the Flush Mount Wall Sensor has the optional Push-Button Override, this is the amount of the VAV/Zone Controller will resume using its Occupied Setpoints during unoccupied mode. This will generate a call for the Air Handler to start its fan and provide heating or cooling, depending on how you configure the Air Handler.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>0.0 Hr</td>
<td>0.0 Hr</td>
<td>8.0 Hr</td>
</tr>
</tbody>
</table>

If the Energy Management System (EMS) is activated, the heat and cool setpoints can be spread apart by this amount.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum EMS Setpoint</td>
<td>0°F</td>
<td>0°F</td>
<td>30°F</td>
</tr>
</tbody>
</table>

The Thermistor Type III sensor readings can be calibrated. Enter a Positive value to increase a reading and a Negative value to decrease a reading.

**Note:** The Supply Air Temperature calibration offset only operates on the reading when the VAV/Zone Controller has its own Supply Air Temperature sensor installed on the AUX2 input. If the supply temperature is received from a global broadcast, you will need to go to the air handler to calibrate the temperature reading.
VAV/Zone Status Screens

Programming

VAV/Zone Status

Status Screen #1 - Mode of Operation

<table>
<thead>
<tr>
<th>Line 1</th>
<th>XX Box v4.01 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Occupied Mode</td>
</tr>
<tr>
<td></td>
<td>Vent Mode</td>
</tr>
<tr>
<td></td>
<td>Belongs to Group # 1</td>
</tr>
</tbody>
</table>

Line 2
Unoccupied Mode
Occupied Mode
Override Mode
Override Pending*
Damper Calibration
Group Override

Line 3
OFF Mode
Vent Mode
Cooling Mode
Heating Mode
Sensor Fail Mode**

Line 4
Belongs to Group # xx
No Group Affiliation

* Not displayed when using a Digital Room Sensor.
** Displays for either a temperature sensor failure or an airflow sensor failure.

Status Screen #2 - Zone Temperature and Cooling/Heating Setpoints

<table>
<thead>
<tr>
<th>Line 1</th>
<th>XX Box v4.01 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone Temp...: XX.X°F</td>
</tr>
<tr>
<td></td>
<td>Cooling Spt: XX.X°F</td>
</tr>
<tr>
<td></td>
<td>Heating Spt: XX.X°F</td>
</tr>
</tbody>
</table>

Line 2
Current Zone Temperature

Line 3
Currently active Cooling Setpoint based on the current Occupied / Unoccupied mode of operation.

Line 4
Currently active Heating Setpoint based on the current Occupied / Unoccupied mode of operation.

Status Screen #3 - Slide Offset & H/C Demand

<table>
<thead>
<tr>
<th>Line 1</th>
<th>XX Box v4.01 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slide Offset: XX°F</td>
</tr>
<tr>
<td></td>
<td>H/C Demand.: XX.X°F</td>
</tr>
</tbody>
</table>

Line 2
If the optional Setpoint Slide Adjust is installed on the Flush Mount Wall Sensor, this line will display the current amount the Slide Offset is affecting the Heating and Cooling Setpoints.

Line 3
Current Heating or Cooling Demand in the Zone based on the current Heating and Cooling Setpoints when compared to the current Zone Temperature.

Line 4
Blank

Status Screen #4 - Supply Air Temperature & Box Air Temperature

<table>
<thead>
<tr>
<th>Line 1</th>
<th>XX Box v4.01 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply Air: XX.X°F</td>
</tr>
<tr>
<td></td>
<td>Box Air..: XX.X°F</td>
</tr>
</tbody>
</table>

Line 2
Current Supply Air Temperature received via broadcast from the DX Air Handler or from the Box Controller’s own installed Box Air Temperature Sensor connected to the AUX input of the VAV/Zone controller board.

Line 3
Current Box Air Temperature
If you have configured the VCM-X controller to broadcast the Supply Air Temperature to the VAV/Zone controller and don’t have a Box Air Temperature Sensor attached to the AUX input on the VAV/Zone controller board, this line will display the Supply Air Temperature the same as line 2.

If you have a Box Air Temperature Sensor attached to the AUX input on the VAV/Zone controller board, this line will display the Box Air Temperature at the location where the Box Air Temperature Sensor is installed.

Line 4
Blank
Status Screen #5 - Zone Damper Position, Airflow, and Desired CFM

XX Box v4.01 IDXXXX
Damper FRC: XXX %
Airflow: XXXX CFM
Desired: XXXX CFM

Line 2 Current Zone Damper Position
If you entered a FORCE command, the letters FRC will appear. If this is normal damper operation, the FRC will not be displayed.

Line 3 If this is a Pressure Independent box, the current Airflow will be displayed. If not, this line will display the desired damper position.

Line 4 If this is a Pressure Independent box, this line will display the Desired CFM the box would like to provide to the zone. If not, this line will display [Controls to +/- 3%] to indicate how accurately the damper will maintain the desired position.

Status Screen #6 - Fan Status & Reheat Stages

XX Box v1.04 IDXXXX
Fan Status: OFF
Heating Relay#1: OFF
Heating Relay#2: OFF

Line 2 If this is a Fan Powered box, this line will display the Fan On/Off Status. On non-fan powered boxes, this line will display [Exp Relay 1 Not Used].

Line 3 If your VAV/Zone Controller has been configured to control reheat stages, this line reflects the On/Off Status of the first stage of Reheat. If you have 3 stages of reheat, this line will display the total number of active heating stages.

Examples:
- “1 Reheat Stages On” or
- “2 Reheat Stages On” or
- “3 Reheat Stages On”

If proportional heating is used (you have no relays configured for heat), this line will display “Heating Signal: xxx %”.

Line 4 If your VAV/Zone Controller has been configured to control reheat stages, this line reflects the On/Off Status of the second stage of Reheat. If you have 3 stages of reheat as explained on line 2, this line will be blank.

Status Screen #7 - Alarm Status

XX Box v1.04 IDXXXX
NO ALARMS!

Line 2 Blank

Line 3 NO ALARMS!

This is displayed if no alarms are detected. If there are one or more alarms active, the possible messages are shown below:
- SPACE SENSOR FAILURE
- CFM SENSOR FAILURE
- DAMPER OPENING ALARM
- DAMPER CLOSING ALARM
- HI SPACE TEMP ALARM
- LO SPACE TEMP ALARM
- DPR FEEDBACK FAILURE

For Alarm Definitions, see the VCB-X Controller Field Technical Guide.
MiniLink PD Configuration

NOTE: For this version of VCB-X, the only screens you need to configure are Screens 6 through 65 if they pertain to your system.

In order to correctly setup the MiniLink PD, you must first configure several parameters in regard to the type of system and operating parameters for the system it is installed on. Most of these values and operating parameters are only set once at the initial system setup and are never changed.

Modular Service Tool Instructions

From any Menu Screen, press the <Configuration> button. The Unit Selection Screen will appear requesting that you enter the unit ID number.

Enter the correct unit ID number of the controller you want to configure and press <Enter>. You will then see Unit Configuration Screen #1.

Configuration Screen #1 - System Type

This screen allows you to select whether you want the system to behave as a VAV system or a Zoning System. If you select VAV, this will allow tenant logging for your VAV system.

Configuration Screen #2 - Last Polled Zone

This zone is the last zone on the local loop of your zoning system that is to be included in zone voting.

Configuration Screen #3 - Mode Changeover Time

This is the amount of time that you want to allow between changeover from heating to cooling modes.

Configuration Screen #4 - Optimal Start Target Zone

This is the unit ID of the Zone that you want to be satisfied by the normally scheduled start time. If you enter “-1” into this box, it will average all zones instead of picking a specific zone. If you do not require Optimal Start, enter “0”.

Configuration Screen #5 - Maverick Testing

Disabling the Maverick Testing allows known troubled zone(s) to continue voting without causing a Maverick alarm. In other words, all zones are included in the voting regardless of whether they are more than four degrees from setpoint.

Configuration Screens #6-65 - Alarm Polling

Enabling Alarm Polling allows any alarm from the loop to be polled. You must set this for each controller on the loop.
MiniLink PD Status

Status Screen #1 - Schedule Mode, System Status, and Minutes Left

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Current Schedule Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Can be System Occupied or System Unoccupied.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 3</th>
<th>Currently System Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Can be Vent Mode, Cooling Mode, or Heat Mode.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 4</th>
<th>Minutes Left In Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The number of minutes left in the current mode of operation before it can switch modes. This value is user-adjustable. See Configuration Screen #3.</td>
</tr>
</tbody>
</table>

Status Screen #2 - Mode Priority, Cool Total, and Heat Total

Polling Device
No Mode Priority
Cool Total.: XX.X°F
Heat Total.: XX.X°F

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Mode Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Can be Heat Priority or Cool Priority. This is based on the voting zones and their demand.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 3</th>
<th>Cool Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total cooling temperature demand from all zones.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 4</th>
<th>Heat Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total heating temperature demand from all zones.</td>
</tr>
</tbody>
</table>
Troubleshooting

VCB-X Outputs Force

Outputs Force

Outputs Force settings are available for testing or troubleshooting the system. These Force settings can be accessed and programmed from the Modular Service Tool.

Caution: The Outputs Force settings should only be applied by qualified service personnel. Serious damage to the HVAC unit could result from improper use of these Outputs Force settings.

To access the Outputs Force settings, simply press the <Balance-Test> button on the Modular Service Tool. You will then see the Unit ID Screen.

Enter the unit ID of the VCB-X Controller you wish to access and press <Enter>. The Outputs Force settings are only available for the VCB-X Controller. They are not supported for the VAV/Zone controllers or other Add-on controllers. If you enter a unit ID for any other type of unit except a VCB-X Controller, the following screen will be displayed:

Unit XXX Does Not Support The Function
Press Any Key To Continue

If you entered the unit ID of a VCB-X Controller, the following screen will be displayed:

1) Outputs Force
2) Dampers Force

Press <1> to access the Outputs Force Screen.

The first Outputs Force Screen allows the AHU fan relay to be set for Auto, ON, or OFF by entering a 0, 1, or 2 as desired. The default setting is 0=AUTO. After you complete all troubleshooting or testing procedures, all relays should be changed back to this setting. The 1=ON setting will force the relay to the ON (energized) position. The 2=OFF selection will force the relay to the OFF (de-energized) position.

The next screen displays the Relay Overrides for Relays 2-23. After pressing <Enter>, the next relay will be displayed. All 23 Relay Override Screens (including the AHU fan relay) are available by pressing <Enter> after each setting is made.

Relay Overrides
Relay XX Override: 0
[0=AUTO 1=ON 2=OFF]

After the screen for Relay 23 is displayed, the first Analog Output Override Screen will be displayed.

Main Fan VFD Override Screen
Main Fan VFD Override Volts: -1.0
[-1.0 = AUTO]

The default setting for normal operation is -1.0 volts. Voltages between 0 to 10.0 can be set for any of the Analog Output Overrides. Press <Enter> after making a setting change and the next Analog Output Override Screen will be displayed.

Economizer Override Screen
Economizer Override Volts: -1.0
[-1.0 = AUTO]

The default setting for normal operation is -1.0. Voltages between 0.0 and 10.0 can be set. Press <Enter> after making a setting change and the next Analog Output Override Screen will be displayed.

Modulating Heat Override Screen
Modulating Heat Override Volts: -1.0
[-1.0 = AUTO]

The default setting for normal operation is -1.0. Voltages between 0.0 and 10.0 can be set.
Press <Enter> after making a setting change and the next Analog Output Override Screen will be displayed.

**Exhaust Fan Override Screen**

<table>
<thead>
<tr>
<th>Exhaust Fan Signal Override Volts: -1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ -1.0 = Auto]</td>
</tr>
</tbody>
</table>

The default setting for normal operation is -1.0. Voltages between 0.0 and 10.0 can be set. Press <Enter> after making a setting change and the next Analog Output Override Screen will be displayed.

**Modulating Cool Override Screen**

<table>
<thead>
<tr>
<th>Modulating Cool Override %...: -10</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ -10 = Auto]</td>
</tr>
</tbody>
</table>

The default setting for normal operation is -10 percent. Percentages between 0 to 100 can be set. Press <Enter> after making a setting change and the next Analog Output Override Screen will be displayed.

**Modulating Condenser Override Screen**

<table>
<thead>
<tr>
<th>Mod. Condenser Override Volts: -1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ -1.0 = Auto]</td>
</tr>
</tbody>
</table>

The default setting for normal operation is -1.0. Voltages between 0.0 and 10.0 can be set.
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