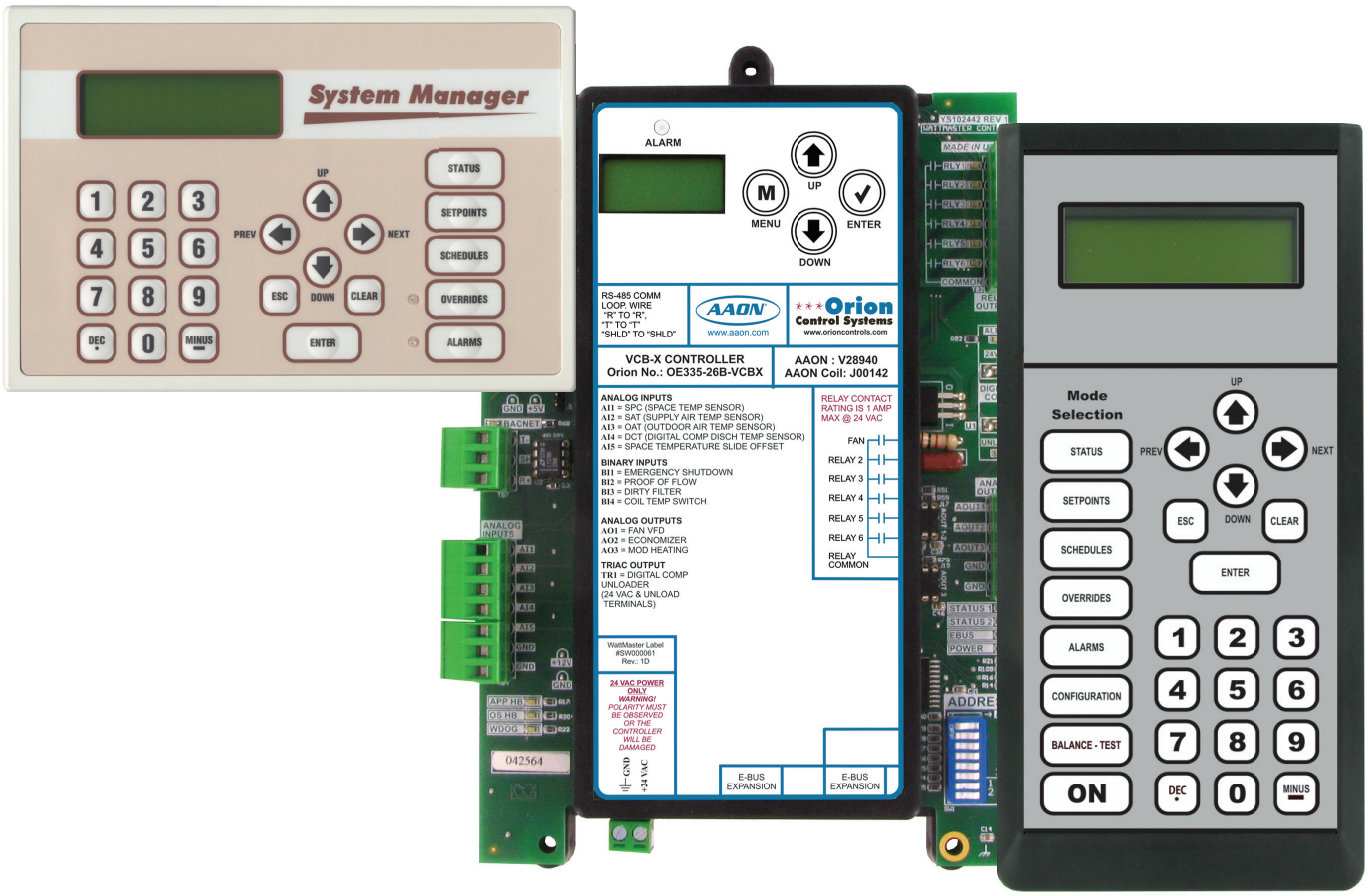
# VCB-X Controller Operator Interface SD Technical Guide

**VCB-X Controller Code: SS1051 Version 2.00 & up**
**VAV/Zone Controller Code: SS1001, SS1005, SS1025**
**Requires Modular Service Tool SD Code: SS1063**
**Requires Modular System Manager SD Code: SS1064**



# IMPORTANT NOTICE

**This technical guide provides instructions for using the Modular Service Tool and Modular System Manager SD with the VCB-X & VAV/Zone Controllers only. If you are using a different controller, you can download the applicable SD Technical Guide listed below from our website—orioncontrols.com. The technical guides can also be printed from the SD card.**

**VCM-X & VCM-X E-BUS Controller - AA-VCMXRNEOISD-TGD**
**RNE Controller - AA-VCMXRNEOISD-TGD**
**SA E-BUS Controller - AA-SAOISD-TGD**
**VCM Controller - AA-VCMOISD-TGD**
**VAV/CAV and MUA II Controllers - AA-VAVCAVMUAOISD-TGD**

# SD CARD UPDATING INSTRUCTIONS

**The Modular Service Tool and Modular System Manager are equipped with an SD memory card. This SD card can be removed and easily updated through a computer by downloading updates, as they become available, from our website to your computer.**

**In order to perform any updates, your computer needs an SD card drive or you will need to purchase an SD card adapter.**

**Download instructions are found in Appendix B on page 82 of this manual.**

**www.aaon.com**

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AAON Part Number: V28170

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## Modular Service Tool SD

The OE391-12 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 the VAV/CAV, MUA, VCB-X, VCM, VCM-X, VCM-X E-BUS, RNE, SA E-BUS or VAV/Zone Controller on the control system communications loop. However, this manual only applies to VCB-X and VAV/Zone Controllers. See note in the inside front cover for the list of manuals that pertain to other controllers.

The Modular Service Tool is housed in an attractive black 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 straight forward, 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 a programmable 4 Gigabyte SD memory card, (4) AA 1.5 V batteries, a wall mount, a DC power supply, a mini-Din communication cable, and an E-BUS communication cable. The mini-Din cable allows you to connect the Modular Service Tool to any Orion controller which has a mini-Din connector socket for programming, monitoring, and troubleshooting purposes.

The Modular Service Tool is also equipped with an EBC E-BUS port and an RS-485 three conductor terminal block port. The E-BUS port and included E-BUS cable are used for updating E-BUS Module software (described in Appendix C). The RS-485 port is used for hard-wiring to older controllers that do not have a mini-DIN connector socket.

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.

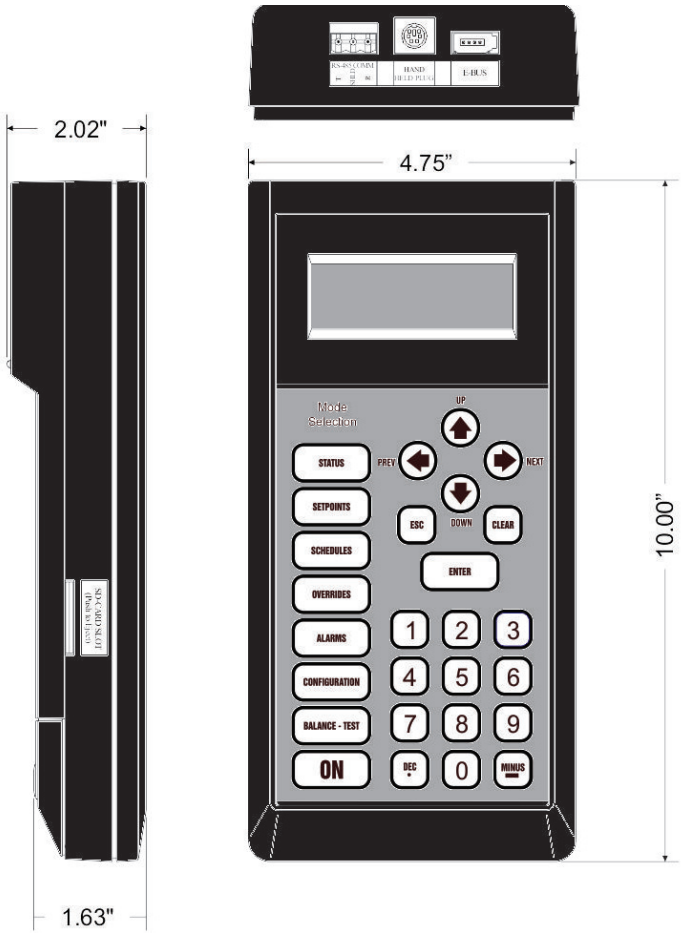



**Figure 1: Modular Service Tool SD Dimensions**

## Modular Service Tool

Whether you have a Stand Alone, Interconnected, or Networked VCB-X Control System, the Modular Service Tool always connects to the 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 controller. If this is an Interconnected System, all controllers that are interconnected with communications cable can be programmed from any controller on the loop. If this is a Networked System, all controllers on the entire Networked System can be programmed from one 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.

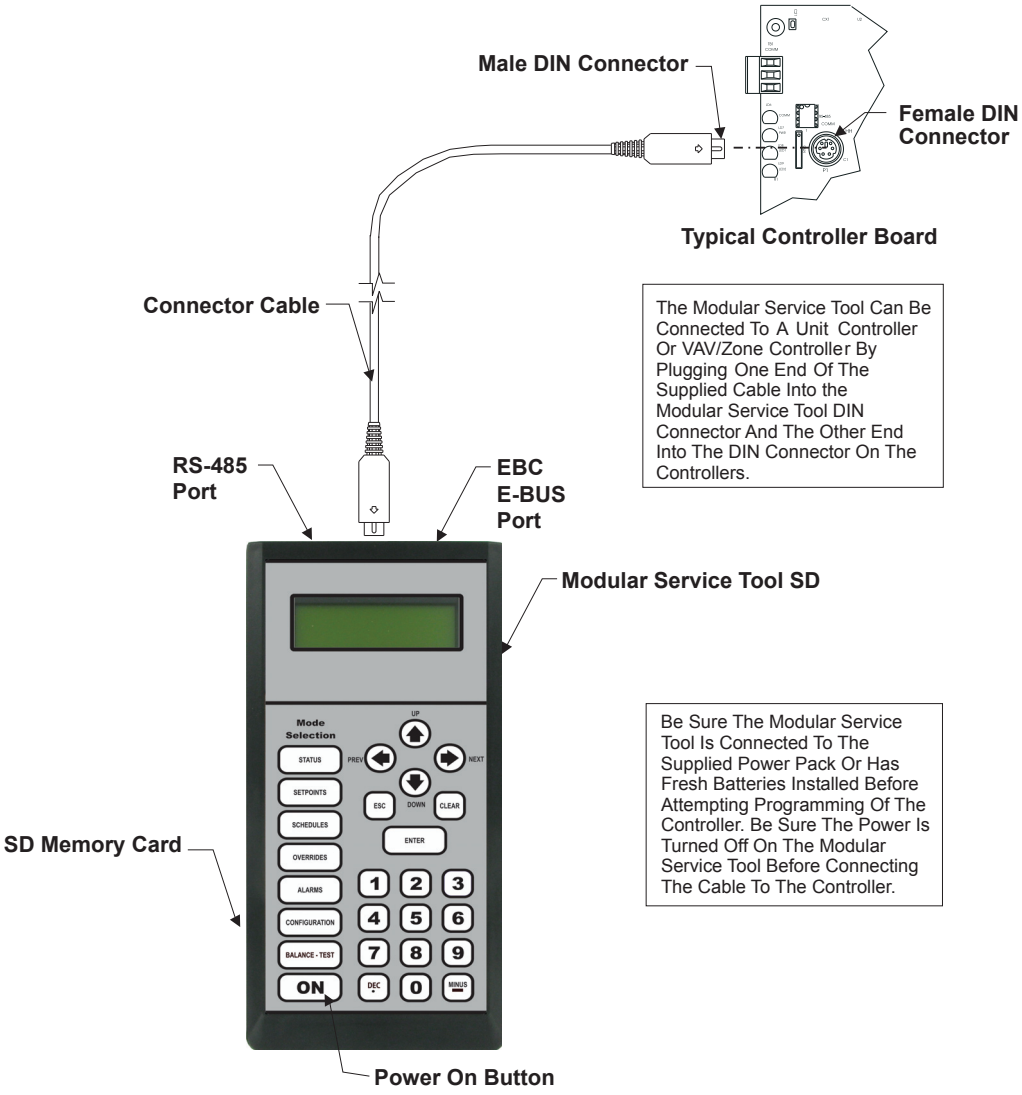



**Figure 2: Modular Service Tool SD**

## Modular System Manager SD

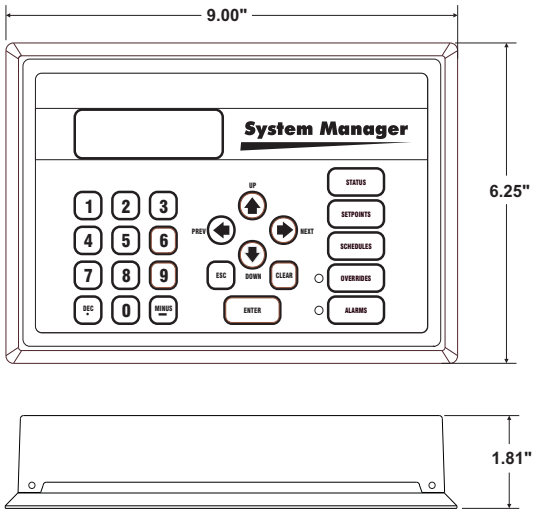



**Figure 3: Modular System Manager SD Dimensions**

The OE392-12 Modular System Manager SD provides a direct link to enable you to view the status and adjust the setpoints of the VCM-X, VCM-X E-BUS, VCB-X, RNE, SA E-BUS, VCM, VAV/CAV, MUA II or VAV/Zone Controller on the control system communications loop. The System Manager SD is housed in a beige-colored plastic enclosure. The System Manager has a programmable 4 Gigabyte SD card and is equipped with a 4-line-by-20-character backlighted display panel and a 24-key membrane keypad for data selection and entry. All keypad operations are simple and straight forward, utilizing non-cryptic plain English language messages. Menu-driven programming allows for easy setup and operation without the need for specialized training. The System Manager also has 2 integral LEDs for user notification of system alarm conditions and override initiations. Protection from unauthorized users is provided by the System Manager's integral multi-level passcode authorization programming.

On a Networked System, the Modular System Manager is connected to the communications and power loop of the system via modular cables that simply plug into the System Manager board and the Power/Comm Distribution Board. This virtually eliminates wiring errors and makes installation fast and easy. When it is to be connected to a Stand-Alone system, a cable with modular connectors on one end and stripped wire ends on the other end is provided to facilitate connecting communications and power to the Modular System Manager from the 24 VAC power source and the HVAC unit controller communication wiring terminals.

The Modular System Manager is designed for wall mounting. Mounting holes are provided to attach the Modular System Manager to a standard handy box. It is recommended that the System Manager be mounted at approximately eye level to allow for ease of programming and reading of the display. The System Manager is typically mounted in the building manager's or superintendent's office or in an equipment room. The attractive enclosure is quite suitable for mounting in any location.

## Network Connection

As previously described, when you are connecting the Modular System Manager to a Networked System, the Modular System Manager is connected to the communications and power loop of the system via modular cables. These cables simply plug into the System Manager board and to any device with modular connectors on any local loop on the system. Devices with modular connectors include the Power/Comm Distribution Board, VAV/Zone controller, and MiniLink Polling Device. By using these plug-in connections, wiring errors are virtually eliminated and system installation is fast and easy. See **Figure 4** below for typical connection information. See **Figure 5 on page 8** for typical Power/Comm board wiring and connection information.

When the System Manager is to be connected to a Stand Alone system, a 12-foot cable with modular connectors on one end and stripped wire ends on the other end is provided for this purpose. This is used to facilitate connecting communications and power wiring to the Modular System Manager from a 24 VAC power source and to the HVAC unit controller communication wiring terminals. See **Figure 6 on page 9** for wiring details. If the supplied cable wire is not long enough for your installation, a standard modular cable of the correct length can be purchased through WattMaster and one of the modular connectors can be cut off to allow for the transformer and communication terminal wiring connections. It is recommended that you do not splice the communications wire if at all possible. The transformer should be rated at 6 VA minimum power output.

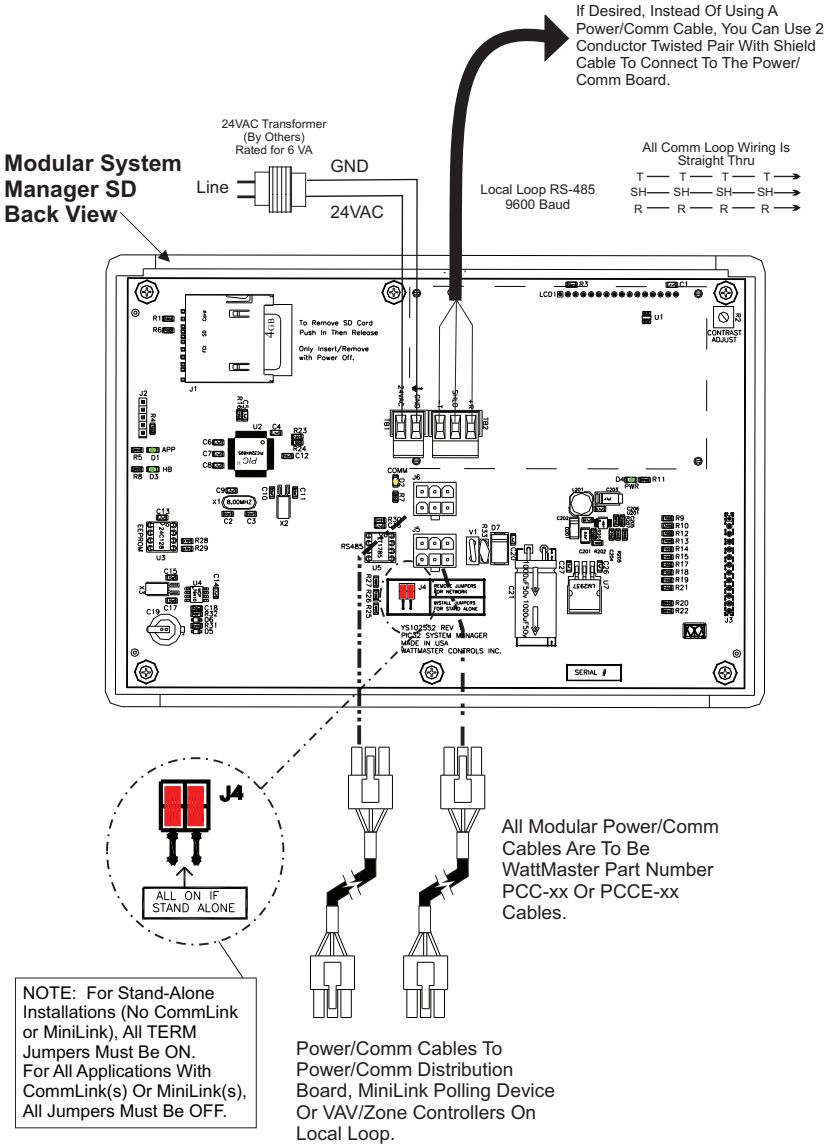



**Figure 4: Modular System Manager SD - Network**

# Power/Comm Board Wiring

**WARNING!**
**DO NOT GROUND THE 24V TRANSFORMER THAT IS TO BE USED WITH THE POWER/COMM BOARDS. GROUNDING OF THE TRANSFORMER WILL DAMAGE THE POWER/COMM BOARD AND ALL BOARDS CONNECTED TO IT. A SEPARATE TRANSFORMER MUST BE USED FOR EACH POWER/COMM BOARD. NO EXCEPTIONS. DO NOT CONNECT ANY OTHER DEVICES TO THE TRANSFORMER USED FOR THE POWER/COMM BOARD!**

A Power/Comm Cable Can Be Used To Connect With The MiniLink PD Instead Of Using 2 Conductor Twisted Pair With Shield Cable. You Can Also Use A Power/Comm Cable To Connect With Another Power/Comm Board, A System Manager Or A VAV/Zone Controller.

If Desired, Instead Of Using A Power/Comm Cable, You Can Use 2 Conductor Twisted Pair With Shield Cable To Connect To The Power/ Comm Board From The Unit Controller, MiniLink PD, Or Another Power/Comm Board.

Line Voltage

24VAC

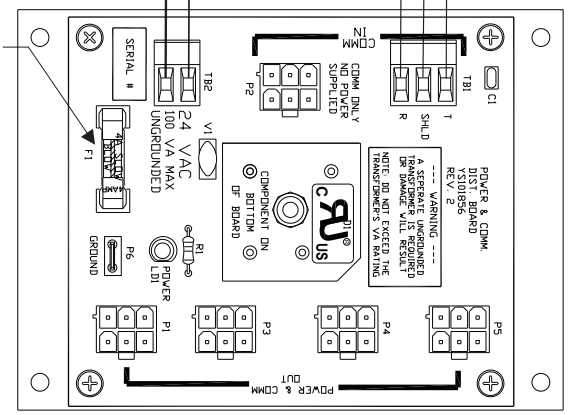
24VAC Transformer (By Others)

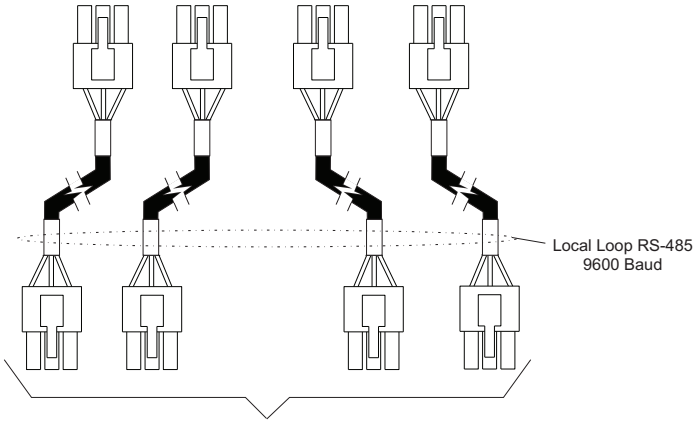
Local Loop RS-485
9600 Baud

All Comm Loop Wiring Is Straight Thru

T — T — T — T →
SH — SH — SH — SH →
R — R — R — R →

4 Amp Slow Blow Fuse



Local Loop RS-485
9600 Baud

Power/Comm Cable To Other Power/Comm Board(s), System Manager, Or VAV/Zone Controllers On Local Loop Only.

**NOTE:**
**Diagram Shown Is For Wiring Of Power/Comm Board When Used For Connecting Local Loop Devices Such As VAV/Zone Controllers, System Manager(s) and Other Power/Comm Boards.**

**Figure 5: Typical Power/Comm Board Wiring**

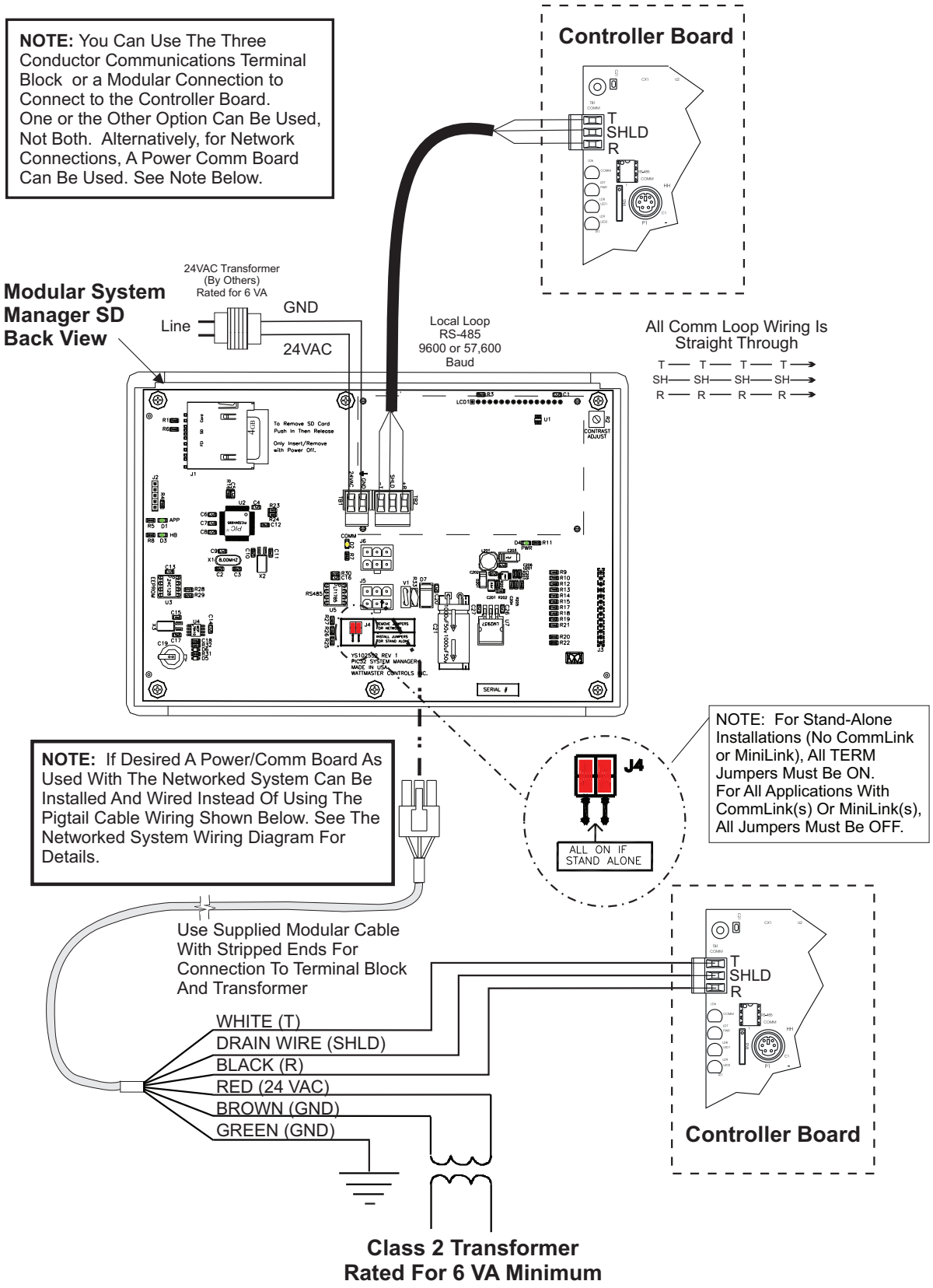



**Figure 6: Modular System Manager SD - Stand Alone**

# Modular Service Tool Keys

## 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 2 computer front-end software installed. Two different Operator Interfaces are available for programming of the VCB-X Controls System—the Modular Service Tool SD 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 SD. If using the System Manager TS II, please see the *System Manager TS II Technical Guide*. If using Prism 2, please see the *Prism 2 Technical Guide*.

The Modular Service Tool allows you to view any input or output status 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.

| Keypad Description | Key Function |
|---|---|
| ESC | Use this key to exit from screens or from data entry or to return to the Main Screen from any screen in the system. |
| ENTER | Use this key to enter a new value. |
| Clear | 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 Screen |
| Minus | If a setpoint with a negative value is required, press this key for the minus sign. |
| DEC | Press this key when entering data that requires a decimal point. |
| ⇦ ⇨ | Use these keys to change values in the Configuration Screens as prompted. |
| ⇧ ⇩ | Use these keys to step backward or forward through the screens. |

**Table 1: Keypad Descriptions**

## 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.

| Button Description | Mode Selection Buttons |
|---|---|
| STATUS | Pressing this button takes you directly to the controller "Status" screens. |
| SETPOINTS | Pressing this button takes you directly to the controller "Setpoints" screens. |
| SCHEDULES | Pressing this button takes you directly to the controller "Schedules" screens. |
| OVERRIDES | Pressing this button takes you directly to the controller "Overrides" screen. See the "Override Button" section on **page 21** for a description of this function. See Note 1 below. |
| ALARMS | Pressing this button takes you directly to the controller "Alarms" screen. See the "Alarms Button" section on **page 20** for a description of this function. |
| CONFIGURATION | Pressing this button takes you directly to the controller "Configuration" screens. |
| BALANCE-TEST | Pressing this button takes you directly to the controller "Balance-Test" screens. |

**Notes:**

(1) The Modular Service Tool will only search the Overrides one loop at a time. You must enter the Loop number and the MiniLink PD unit ID (60).

**Table 2: Button Descriptions**

## Modular Service Tool Initialization

### Modular Service Tool Initialization Screen and Setup Screens

After connecting the Service Tool to the controller with the supplied cable, *press* **<ON>**. The *Initialization Screen* will appear followed by the *Setup Screens* as shown below. If there is no SD card installed, the second screen will display, "No SD Card Connected! Powering Down!"

```
   Initializing
Service Tool vX.XX
WattMaster Controls
```

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

```
 3) Energy Saving
 4) Update Software
NEXT) More Options
ESC) Exit Menu
```

**NOTE:** Once you *press* **<ESC>** while at the *Setup Screens* shown above, you can access them again by pressing **<NEXT>** or cycling power.

## Setting The 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.

**NOTE:** If you are in a time zone that has daylight savings, you will need to manually adjust the time twice a year.

### Programming the Time

From the *Setup Screen s*hown below, *press* **<1>** on your keypad to access the *Set Time & Date Screens*.(You may have to *press* **<NEXT>** to access this screen).

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

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.

The two screens that follow will appear. To scroll through the fields, press **<⇩>** or **<ENTER>**. In order to save a new value, you must press **<ENTER>**.

```
 Program Time/Date
Day   (Sunday=0):  X
Enter Hr. (0-23): XX
Enter Minutes   : XX
```

**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)

### Programming the Date

To scroll through the fields, press **<⇩>** or **<ENTER>**. In order to save a new value, you must press **<ENTER>**.

```
 Program Time/Date
Month    (1-12):  XX
Day      (1-31):  XX
Year    (00-99):  XX
```

**Month** - Enter the Month (1 to 12)

**Day** - Enter the Day of the Month (1 to 31)

**Year** - Enter the current Year with two digits (00 to 99)

When you have finished programming the time and date, *press* **<ESC>** to return to the *Setup Screen* shown below.

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

# Setting the Operating Mode and Energy Saving Timer

## Setting the Operating Mode

The Operating Mode is displayed on the last line of the *Main Screen* as shown below. The factory default setting for the Service Tool is **LS (Low Speed) Stand Alone Mode**. **LS Stand Alone Mode** is the correct configuration for the VCB-X Controller when in Stand Alone Mode.

```
Service Tool SD vX.XX
 01/16/15 02:21 PM
  LS  Stand Alone
 No Communication
```

If you are using this Service Tool on a communications loop and have an installed MiniLink PD or CommLink, you will need to change the setting to **LS (Low Speed) Network Mode**.

If you are using a VCB-X Controller that is set for high speed, you will need to change the setting to **HS (High Speed) Stand Alone Mode** or **HS (High Speed) Network Mode**.

If your display indicates a different mode than the one you need, *press* **<2>** at the *Setup Screen* shown below. You may have to *press* **<NEXT>** to access this screen.

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

The *Communications Screen* will appear as shown below.

```
  Stand Alone Mode
Lo Speed Connection
Use Left/Right Arrow
To Change Selections
```

*Press* **<⇦>** or **<⇨>** to select the proper mode of operation.

When you have made your selection, *press* **<ENTER>**. The following screen will appear.

```
You Have Changed The
    System Mode
  Press Any Key To
     Continue
```

*Press* any key to continue. The *Setup Screen* will appear as shown below:

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

## 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 set the Energy Saving Timer, *press* **<NEXT>** at the first *Setup Screen* and **<3>** at the second *Setup Screen* shown below. (You may have to *press* **<NEXT>** to access these screens).

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

```
 3) Energy Saving
 4) Update Software
NEXT) More Options
ESC) Exit Menu
```

The *Energy Saving Screen* will appear as shown below:

```
    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 and *press* **<ENTER>**. To cancel the automatic power down, *enter* **<99>** and *press* **<ENTER>**. After you have entered a number between 1 and 99 minutes, *press* **<ESC>** to exit the screen.

The *Setup Screen* will appear again as shown below:

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

## Modular Service Tool Alarm Search

**NOTE:** When you *press* the **<ALARMS>** button on the Modular Service Tool, it will search only the unit ID that you have entered; therefore, you must search each unit individually to access all alarms for that controller.

To search for alarms, *press* **<ALARMS>** while on any screen but the *Main Screen*. The *Unit Selection Screen* will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller the Service Tool is connected to and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

One of the following screens will appear:

```
VCB-X    V.XXX

  NO ALARMS
```

```
 VCB-X   V.XXX

 ALARMS PRESENT
SCROLL DOWN TO VIEW
```

*Press* **<⇩>** to scroll through all the alarms for the controller that the Modular Service Tool is connected to.

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.

## Modular Service Tool Override Search

When a space sensor with override option is used with any VAV/Zone or Unit Controller, the Modular Service Tool can determine and report any controllers that are currently operating in an override condition on a specific Loop by entering a Loop ID number and then doing a search.

**NOTE:** When you *press* the **<OVERRIDES>** button on the Modular Service Tool, it will search only the Loop number that you enter; therefore, you must search each loop individually to access all overrides.

To access the *Overrides Screen*, *press* **<OVERRIDES>** from the Modular Service Tool's keypad. A screen will appear asking you to enter the unit ID.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID for the MiniLink PD (MLPD) of the loop you wish to search and *press* **<ENTER>**. The MLPD is always address 60 on each loop. So the unit ID of any particular MLPD would be the loop number followed by 60. In the example above, Loop 1, address 60 has been entered. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

Once communications are successful, one of the following screens will appear:

```
VCB-X    V.XXX

 NO OVERRIDES
```

```
 VCB-X    V.XXX

 OVERRIDES PRESENT
SCROLL DOWN TO VIEW
```

After the Service Tool completes its search, it will post a message to tell you if there are overrides present. If there are overrides, *press* **<⇩>** and all units on the loop will be listed showing 'Override: Yes or No.' *Press* **<OVERRIDES>** again to access overrides on a different loop. Enter the Unit ID of the MLPD of that loop.

# Schedules and Holidays

## Scheduling

You can access the Unit Controller Scheduling Screens by *pressing* **<SCHEDULES>**. The *Unit Selection Screen* will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller the Service Tool is connected to and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

*Press* the **<⇩>** button and then *press* **<ENTER>** to access the scheduling function you wish to view.

```
   Schedule Menu
Schedule Override
Week Schedules
Holidays
```

### Week Schedules

**Event #1**

```
    VCB-X Schd
Sunday    Event #1
Start Time..: XXXX
Stop Time...: XXXX
```

**Event #2**

```
    VCB-X Schd
Sunday    Event #2
Start Time..: XXXX
Stop Time...: XXXX
```

If you are using the internal scheduling capability of the Unit 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* **<ESC>**. 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. **(Also, use for Remote Forced Occupied applications using the Forced Occupied Binary Input.)**

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

```
    VCB-X Hldy
   Holiday #  1
Start Mon/Day.: XXXX
 [ July 4th = 704 ]
```

```
    VCB-X Hldy
   Holiday #  1
Stop Mon/Day.: XXXX
 [ July 5th = 705 ]
```

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

## Holiday Start/Stop Times

```
     VCB-X Hldy
  Holiday Schedule
Start Event #1: XXXX
Stop  Event #1: XXXX
```

```
     VCB-X Hldy
  Holiday Schedule
Start Event #2: XXXX
Stop  Event #2: XXXX
```

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

```
     VCB-X Ovrd
  Schedule Override
Enter Override...: X
[0=Auto 1=ON  2=OFF]
```

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.

# System Manager SD Keys and Buttons

## Operator Interfaces

In order to configure and program the Orion System controllers, you must have an Operator's Interface or a personal computer with the Prism 2 computer front-end software installed. Three different Operator Interfaces are available for programming of the Orion Controls System—the Modular Service Tool SD, the Modular System Manager SD, and/or the System Manager TS II. These devices allow you to access the status and setpoints of the controllers on your communications loop. This manual describes the Modular System Manager SD. If using the Modular Service Tool SD, please see the *Modular Service Tool SD Quick Start Guide*. If using the System Manager TS II, please see the *System Manager TS II Technical Guide*. If using Prism 2, please see the *Prism 2 Technical Guide*.

The Modular System Manager SD allows you to view any input or output status 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.

| Keypad Description | Key Function<br>Modular System Manager SD |
|---|---|
| ESC | Use this key to exit from screens or from data entry or to return to the Main Screen from any screen in the system. |
| ENTER | Use this key to enter a new value. |
| Clear | If a data entry mistake is made, press this key to clear the data entry field and start over. |
| Minus | If a setpoint with a negative value is required, press this key for the minus sign. |
| DEC | Press this key when entering data that requires a decimal point. |
| ⇦ ⇨ | Use these keys to change values in the Configuration Screens as prompted. |
| ⇧<br>⇩ | Use these keys to step backward or forward through the screens. |

**Table 3: Keypad Descriptions**

## Mode Selection Buttons

The Modular System Manager 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.

| Button Description | Modular System Manager SD |
|---|---|
| STATUS | Pressing this button takes you directly to the controller "Status" screens. |
| SETPOINTS | Pressing this button takes you directly to the controller "Setpoints" screens and "Configuration" menu. |
| SCHEDULES | Pressing this button takes you directly to the controller "Schedules" screens. |
| OVERRIDES | Pressing this button takes you directly to the controller "Overrides" screen. See the "Override Button" section on **page 21** for a description of this function. See Notes 1 & 2 below. |
| ALARMS | Pressing this button takes you directly to the controller "Alarms" screen. See the "Alarms Button" section on **page 20** for a description of this function. See Notes 1 & 2 below. |

**Notes:**

(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."

(2) The "Search for Units" function must be performed on the System Manager upon initial system setup before this function will be available. See the "Network Mode & Multiple Managers Loop Search" on **page 20** of this manual for complete instructions on performing a loop search.

**Table 4: Button Descriptions**

## System Manager SD Initialization

### System Manager SD Initialization Screen and Setup Screens

After connecting the System Manager to the controller with the supplied cable, *press* **<ON>**. The *Initialization Screen* will appear followed by the *Setup Screens* as shown below. If there is no SD card installed, the second screen will display, "No SD Card Connected! Powering Down!"

**NOTE:** After exiting these screens, you can access them again by *pressing* **<ESC>** and then **<⇦>** or by cycling power.

```
    INITIALIZING
 System Manager SD
       vX.XX
 WattMaster Controls
```

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

```
 3) Change Passcodes
 4) Loop Search
NEXT) More Options
ESC) Exit Menu
```

```
 5) Alarm Search

NEXT) More Options
ESC) Exit Menu
```

## Setting The Time & Date

The System Manager SD 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.

**NOTE:** A Level 1 or Level 2 User can set the time and date.

**NOTE:** If you are in a time zone that has daylight savings, you will need to manually adjust the time twice a year.

### Programming the Time

From the *Setup Screen s*hown below, *press* **<1>** on your keypad to access the *Set Time & Date Screens*.

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

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 Unit Controller to use its own Internal Schedules, the Occupied/Unoccupied modes are calculated on the basis of the current real time clock reading.

The two screens that follow will appear. To scroll through the fields, press **<⇩>** or **<ENTER>**. In order to save a new value, you must press **<ENTER>**.

```
  Program Time/Date
Day   (Sunday=0):  X
Enter Hr. (0-23): XX
Enter Minutes   : XX
```

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

**Hours (Hr) -** Enter the Hour (0-23) in 24-Hour Military Format (13 = 1:00 PM)

**Minutes -** Enter the Minutes (0 to 59)

### Programming the Date

To scroll through the fields, press **<⇩>** or **<ENTER>**. In order to save a new value, you must press **<ENTER>**.

```
  Program Time/Date
Month    (1-12):  XX
Day      (1-31):  XX
Year     (0-99):  XX
```

**Month -** Enter the Month (1 to 12)

**Day -** Enter the Day of the Month (1 to 31)

**Year -** Enter the current Year (0 to 99)

When you have finished programming the time and date, *press* **<ESC>** to return to the *Setup Screen*.

## Setting the Operating Mode

The Operating Mode is displayed on the last line of the *Main Screen* as shown below. The factory default setting for the System Manager is **LS (Low Speed) Stand Alone Mode**.

```
System Manager SD
01/16/15 02:21 PM
 LS  Stand Alone
No Communication
```

The System Manager must be configured for the correct mode of operation for your system. There are 5 modes of operation available for the Orion System—**LS (Low Speed) Stand-Alone, HS (High Speed) Stand-Alone, LS (Low Speed) Network, HS (High Speed) Network**, and **LS (Low Speed) & HS (High Speed) Multiple MGRS**.

If you are using this System Manager on a communications loop that doesn't have a MiniLink PD or CommLink connected to it and you have a single System Manager on your system, then you need to operate in **LS (Low Speed) Stand-Alone Mode**. If you are using a VCB-X Controller or GPC-XP Controller that is set for high speed, and you don't have a MiniLink PD or CommLink connected to the loop, then you will need to change the setting to **HS (High Speed) Stand Alone Mode**.

If you are using the System Manager on a communications loop and have an installed MiniLink PD or CommLink, you will need to change the setting to **LS (Low Speed) Network Mode**. If you are using a VCB-X Controller or GPC-XP Controller that is set for high speed, and are using a MiniLink PD or CommLink, then you will need to change the setting to **HS (High Speed) Network Mode**.

If you are using this System Manager on a communications loop, have a MiniLink PD or CommLink installed, and have multiple System Managers, then you need to operate in **Multiple MGRS Mode**.

If your display indicates a different mode than the one you need, *press* **<2>** at the *Setup Screen* shown below. You will have to cycle power to get to this screen or by *pressing* **<ESC>** and **<PREV>**.

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

The *Passcode Clearance Screen* will appear as shown below.

```
THIS ACTION REQUIRES
A SPECIAL HIGH LEVEL
 PASSCODE CLEARANCE
   Enter: XXXXXXX
```

*Enter* the seven digit passcode **<2337377>** to access the next screen.

You will then see the screen below displayed.

```
  Stand Alone Mode
Lo Speed Connection
Use Left/Right Arrow
To Change Selections
```

*Press* **<⇦>** or **<⇨>** if you need to change the mode of operation to **LS (Low Speed) Stand-Alone, HS (High Speed) Stand-Alone, LS (Low Speed) Network, HS (High Speed) Network**, **LS (Low Speed) Multiple Manager or HS (High Speed) Multiple Manager** and then press **<ENTER>** to save your selection. If you are not using Multiple Manager Mode, *press* **<ESC>** at the screen below and continue scrolling right and left.

```
  Multiple Manager
  Unit Address: 0

 Press ESC to Exit
```

For **Multiple MGRS Mode**, enter the address at which you want this particular System Manager to be set.

When multiple System Managers are used on a local loop, each must be set with a unique address different from any other device on that loop. You must perform this same operation again for each System Manager installed. If you want one of these System Managers to be able to indicate alarms and overrides for the entire system, you must *select* either **LS** or **HS Network Mode** on that particular System Manager.

Once you have the correct number per the display above displayed, *press* **<ENTER>**. The following screen will appear telling you that you have changed the system mode:

```
You Have Changed The
System Manager Mode
 Press Any Key To
    Continue
```

*Press* any key on the keyboard to exit this screen.

## System Manager Passcodes

Changing the mode of operation, updating software, changing schedules, and changing setpoints and configurations require passcode clearance. The screen below will appear if this action requires passcode clearance.

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

The System Manager has three levels of user access. All users can view Status Screens. Level 1 users are limited to changing the Time and Date and Operating Schedules. Level 2 users have complete system access. Any status or setpoint field can be read or reset from the System Manager.

These two levels of passcodes are programmable by any Level 2 user. The default Level 1 passcode is "1111" and the default Level 2 passcode is "2222."

If you wish to change either Level 1 or Level 2 passcodes, please see the instructions that follow.

From the *Main Status Screen*, *press* **<ESC>** and then *press* **<PREV>**. The following screen will appear:

```
  1) Set Time & Date
  2) Communications
NEXT) More Options
ESC) Exit Menu
```

*Press* **<⇨>** for the Next Menu. The following screen will be displayed:

```
 3) Change Passcodes
 4) Loop Search
NEXT) More Options
ESC) Exit Menu
```

*Press* **<3>** for Change Passcodes. The following screen will be displayed:

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

Passcodes can only be changed by a Level 2 user. *Enter* the passcode and *press* **<ENTER>**. The following screen will appear:

```
Enter New Passcode
Level 1.....: XXXX
Level 2.....: XXXX
[Must Be 4 Digits]
```

This screen allows you to enter new Level 1 and/or Level 2 passcodes. Passcodes must always be four digits in length, so the usable range of numbers is 1000 to 9999.

**CAUTION:** If you change the Level 2 passcode and cannot remember what it is, you will be locked out of your system!

# Loop Search and System Alarm Search

## Network Mode & Multiple Managers Loop Search

When the System Manager is configured for Network Mode, a loop search must initially be performed for the System Manager to recognize alarms or overrides. Also, when you have a system that has multiple System Managers and you have one of the System Managers set to (63) Network Mode for alarm and override indication, you must also perform a loop search for that System Manager. This allows the System Manager to be aware of all alarms and overrides for all local loops on the entire system.

To access the *Loop Search Screen*, from the *Setup Screen*, *press* **<ESC>** and then *press* **<PREV>**.

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

*Press* **<⇨>** for Next Menu. The following screen will be displayed:

```
 3) Change Passcodes
 4) Loop Search
NEXT) More Options
ESC) Exit Menu
```

*Press* **<4>** for Loop Search. The following screen will be displayed:

```
     Loop Search
  Current Loop = XX
   Loops Found = XX
      Searching
```

The System Manager will now proceed to search all loops to find the MiniLink PDs that are connected to the system. The screen will display the current loop being searched and the number of loops currently found.

Once the search is completed, the following screen will be displayed:

```
     Loop Search
      Finished
   Loops Found = XX
  Press ESC to Exit
```

The screen will display the number of loops found on your system. The information will be saved into the System Manager's memory. No further loop searches will be required unless you add an additional MiniLink PD to the Network System.

## System Alarm Search

The System Manager can be used to search for all active alarms on the system. You must configure the MiniLink PD to allow for "Alarm Polling" for each controller you want polled for alarms. See the MiniLink PD programming section on **page 76** of this manual for setting information.

This option will alert you of the number of alarms present on individual units, but will not tell you what type of alarm are present. You will have to perform and individual unit alarm search for detailed alarm information.

To access the *Alarm Search Screen*, from the *Setup Screen*, *press* **<ESC>** and then *press* **<PREV>**.

.

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

*Press* **<⇨>** for Next Menu. The following screen will be displayed:

```
 3) Change Passcodes
 4) Loop Search
NEXT) More Options
ESC) Exit Menu
```

*Press* **<⇨>** for Next Menu. The following screen will be displayed:

```
 5) Alarm Search

NEXT) More Options
ESC) Exit Menu
```

*Press* **<5>** for Alarm Search. The entire system is searched from this point. The following screen will be displayed:

```
     Alarm Screen

     SEARCHING!
```

Once the Alarm Search is complete, one of the following screens will display:

```
     Alarm Screen

XX ALARMS ON UNIT XX
```

```
    Alarm Screen

NO ALARMS DETECTED
```

To check controllers individually for alarms, use the **<ALARMS>** button on the Main Display.

## Unit Alarm Search

The System Manager can be used to search for all active alarms one controller at a time.

*Press* **<ALARMS>**. The *Unit Selection Screen* below will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller you wish to search and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will appear. The System Manager will search for any active alarms on the unit and one of the following screens will appear:

```
CONTROLLER    V.XXX

     NO ALARMS
```

```
CONTROLLER    V.XXX

  ALARMS PRESENT
SCROLL DOWN TO VIEW
```

*Press* **<⇩>** to scroll through all the alarms for the controller that the Modular Service Tool is connected to.

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.

## System Manager Override Search

**NOTE:** In order for the Override Search to work, a Loop Search must be performed first. See **page 20** for details.

When a space sensor with override option is used with any VAV/Zone Controller or Unit Controller, the System Manager can determine and report any controllers that are currently operating in an override condition. This function requires that a MiniLink PD is installed on each loop where the controllers may be located. The MiniLink PD must be configured to allow for "Alarm Polling" for each controller that Override Polling Enabled is desired for this function to work. See the MiniLink PD programming section on **page 76** of this manual for setting information.

To access the *Space Sensor Overrides Screen*, *press* **<OVERRIDES>**, The following screen will appear.

```
Overrides Screen

   SEARCHING!
```

After the System Manager completes its search, it will list the first unit on the system that is currently in the override mode. *Press* the **<⇩>** button to scroll through all units that are in the Override Mode.

```
  Overrides Screen
Loop = 1  Unit = 59
  OVERRIDE FOUND
```

# Schedules and Holidays

## Scheduling

You can access the Controller Scheduling Screens by *pressing* **<SCHEDULES>**. The screen below will appear because Scheduling requires passcode clearance. A Level 1 or 2 passcode can change schedules.

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
 Enter Unit Address
  Then Press Enter
Selected Unit#: XXXX
  No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The *Unit Schedule Menu* will be displayed.

```
    Schedule Menu
Schedule Override
Week Schedules
Holiday Schedules
```

*Press* the **<⇩>** button until the cursor is on the desired option and then *press* **<ENTER>**.

## Week Schedules

From the *Unit Schedule Menu*, select Week Schedules. The following two screens will appear in order:

**Event #1**

```
        Schd
 Sunday    Event #1
 Start Time..: XXXX
 Stop Time...: XXXX
```

**Event #2**

```
        Schd
 Sunday    Event #2
 Start Time..: XXXX
 Stop Time...: XXXX
```

If you are using the internal scheduling capability of the 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* **<ESC>**. 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

From the *Unit Schedule Menu*, select Holiday Schedules. The following four screens will appear in order:

```
        Hldy
    Holiday #  1
Start Mon/Day.: XXXX
 [ July 4th = 704 ]
```

```
        Hldy
    Holiday #  1
Stop Mon/Day.: XXXX
 [ July 5th = 705 ]
```

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

## Holiday Start/Stop Times

```
        Hldy
  Holiday Schedule
Start Event #1: XXXX
Stop  Event #1: XXXX
```

```
        Hldy
  Holiday Schedule
Start Event #2: XXXX
Stop  Event #2: XXXX
```

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

From the *Unit Schedule Menu*, select Schedule Override. The following screen will appear:

```
        Ovrd
  Schedule Override
Enter Override...: X
[0=Auto 1=ON  2=OFF]
```

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.

# VCB-X Configuration Screen Index

## VCB-X Configuration Screen Index

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.

| | |
|---|---|
| Screen #1 | Sensor Scaling (Fahrenheit / Celsius) |
| Screen #2 | EM1 Expansion Module Installed |
| Screen #3 | EM2 Expansion Module Installed |
| Screen #4 | MHGRV-X and MODGAS-X Installed |
| Screen #5 | 12 Relay E-BUS Expansion Module Installed |
| Screen #6 | Preheat-X Controller Installed |
| Screen #7 | HVAC Mode Enable Source |
| Screen #8 | HVAC Mode Set By Remote Contact |
| Screen #9 | SAT Reset Source |
| Screen #10 | Reset Rate Interval |
| Screen #11 | Return Sensor Type |
| Screen #12 | Static Pressure Control |
| Screen #13 | Static/Fan Control Rate & Max Increment |
| Screen #14 | Fan Voltage Output - Min/Max |
| Screen #15 | Supply Fan Cycle Mode |
| Screen #16 | Fan Proving |
| Screen #17 | Fan Starting Delay |
| Screen #18 | Purge Mode Delay |
| Screen #19 | Heat Type |
| Screen #20 | Modulating Heat Output Signal - Min/Max |
| Screen #21 | Cool Type |
| Screen #22 | Digital Compressor For Mod Cool |
| Screen #23 | Modulating Cooling Output Signal - Min/Max |
| Screen #24 | Mech Heat/Cool Alarm Delay |
| Screen #25 | Economizer Control Type |
| Screen #26 | Title 24 Economizer |
| Screen #27 | Economizer in Unoccupied Mode |
| Screen #28 | Outdoor Air Sensor Installed |
| Screen #29 | E-BUS Outdoor Air/RH Sensor |
| Screen #30 | Economizer Enable Source |
| Screen #31 | Economizer Control Loop Rate/Proportional Window |
| Screen #32 | Economizer Voltage Output - Min/Max |
| Screen #33 | $CO_2$ Sensor Installed |
| Screen #34 | Building Pressure Control |
| Screen #35 | Building Pressure Control Rate & Max Increment |
| Screen #36 | Exhaust Fan Output |
| Screen #37 | Heat Pump Config |
| Screen #38 | WSHP Glycol Percentage |
| Screen #39 | Aux Heat Type |
| Screen #40 | Dehumidification Control |
| Screen #41 | Humidity Control Sensor Type |
| Screen #42 | Suction Pressure Sensor Installed |
| Screen #43 | E-BUS Space and Humidity Sensor Installed |
| Screen #44 | Reheat Control |
| Screen #45 | Defrost Coil Switch |
| Screen #46 | Head Pressure Control |
| Screen #47 | Condenser Fan Min/Max |
| Screen #48 | Has Water Side Condenser |
| Screen #49 | Type of Airflow Station |
| Screen #50 | Monitor Outdoor Air Airflow |
| Screen #51 | Control Outdoor Air Airflow |
| Screen #52 | Outdoor Airflow Duct Size |
| Screen #53 | Monitor Supply Air Airflow |
| Screen #54 | Supply Airflow Duct Size |
| Screen #55 | Monitor Return Air Airflow |
| Screen #56 | Return Airflow Duct Size |
| Screen #57 | Monitor Exhaust Airflow |
| Screen #58 | Exhaust Airflow Duct Size |
| Screen #59 | Morning Warm Up Type |
| Screen #60 | AHU Uses Schedule Number |
| Screen #61 | Daylight Adjustment Start/Stop Date |
| Screen #62 | Trend Log Rate |
| Screen #63 | Emergency Shutdown |
| Screen #64 | Dirty Filter |
| Screen #65 | Broadcast Outdoor Air Temperature |
| Screen #66 | Broadcast Outdoor RH |
| Screen #67 | Broadcast Building Pressure |
| Screen #68 | Broadcast to Boxes |
| Screen #69 | Cool Stage Up and Down Delays |
| Screen #70 | Cool Stage Min Run and Min Off Delays |
| Screen #71 | Heat Stage Up and Down Delays |
| Screen #72 | Heat Stage Min Run and Min Off Delays |
| Screen #73 | Heat Pump Delays - Aux/Emergency Heat |
| Screen #74 | Heat/Cool Changeover Delay |
| Screen #75 | Return Air Bypass Control |
| Screen #76 | Morning Cool Down |
| Screen #77-81 | VCB-X Relay Configuration Screens |
| Screen #82-86 | EM1 Relay Configuration Screens |
| Screen #87-99 | 12 Relay Configuration Screens |

## 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, shown below, requesting that you enter the unit ID number.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

*Enter* the correct unit ID number of the VCB-X Controller you want to configure and then press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**. You will then see *Unit Configuration Screen #1*. *Press* **<ENTER>** to save entered data and *press* **<⇩>** to scroll through the screens.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

### System Manager SD Instructions

From any Main screen, *press* **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Change Setpoints
Configure Unit
Save/Copy/Restore
```

Scroll down to the 'Configure Unit' option and *press* **<ENTER>**. This will take you to the first Configuration Screen shown below.

### Configuration Screen #1 - Sensor Scaling

```
VCBX Cnfg ID 101
 Sensor Scaling
  Fahrenheit
Use < Or > To Change
```

Options are Fahrenheit or Celsius. If you 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

```
VCBX Cnfg ID 101
EM1 Installed: NO

Use < Or > To Change
```

If you have expansion module EM1 installed, this configuration option should be configured as YES. **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

# VCB-X Configuration Screens

## Configuration Screen #3 - EM2 Expansion Module Installed

```
VCBX Cnfg ID 101
EM2 Installed: NO

Use < Or > To Change
```

If you have expansion module EM2 installed, this configuration option should be configured as YES. **Default is NO.** If your unit utilizes the following, an EM2 Module is required:

- Remote SAT Reset
- Return Air Bypass Control
- Remote Forced Dehumidification
- Remote Forced Cooling
- Remote Forced Heating

## Configuration Screen #4 - MHGRV-X & MODGAS-X Installed

```
VCBX Cnfg ID 101
MHGRV Installed: NO
MODGS Installed: NO
Use < Or > To Change
```

If you have an MHGRV-X Controller installed, the first configuration option should be configured as YES. If you have a MODGAS-X Controller installed, the second configuration option should be configured as YES. **Defaults are NO.**

## Configuration Screen #5 - 12 Relay E-BUS Expansion Module Installed

```
VCBX Cnfg ID 101
12RLY Installed: NO

Use < Or > To Change
```

If you have a 12 Relay E-BUS Expansion Module installed, this configuration option should be configured as YES. **Default is NO**.

## Configuration Screen #6 - PREHEAT-X Controller Installed

```
VCBX Cnfg ID 101
   Preheat-X
 Installed: NO
Use < Or > To Change
```

If you have a PREHEAT-X Controller installed, this configuration option should be configured as YES. **Default is NO**.

## Configuration Screen #7 - HVAC Mode Enable Source

```
VCBX Cnfg ID 101
   HVAC Source
 Single Zone VAV
Use < Or > To Change
```

This selection will determine which sensor will determine the mode of operation of the unit and how it will operate. If selecting HVAC Source Set by Remote Contact as YES in the next screen, you should select Outdoor Air as the HVAC Source in this screen. If you will be using a BACnet command to determine the HVAC mode, then you can leave the selection on this screen at the default. **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 this 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. Also use this configuration if the next screen will be configured for Modes Set By Remote Contact.
- **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.
- **Supply Air/Tempering**—This selection is for VAV "cooling only" applications where because of cold outdoor temperatures, heat may need to be added in order to maintain the "Cooling" Supply Air Setpoint. This application requires outdoor Cooling and Heating Setpoints configured using the Hood On Enable Setpoints, to initiate Cooling and Heating Modes. The Heating Supply Air Setpoint should be set at least 2˚F below the Cooling Supply Air Setpoint. See the Sequence of Operations for details.
- **Return Air**—Optional recirculating unit configuration using the Return Temperature Sensor to determine the Heating, Cooling, and Vent Modes of operation.
- **Space Temperature with High % OA—**If it is preferable to use Space conditions (instead of Outside Air) to control a 100% or high percentage outdoor air unit, this option allows tempering of the outdoor air in the Space Vent Mode of operation to prevent dumping of hot or cold air into the space. See the Sequence of Operations for details. **NOTE:** If this option is selected, the Economizer must be set to **Standard Economizer**.

## Configuration Screen #8 - HVAC Mode Set By Remote Contact

```
VCBX Cnfg ID 101
HVAC Mode Set By
Remote Contact: NO
Use < Or > To Change
```

If you have an EM2 Expansion Module, this option allows separate 24 VAC wet contact closures on that module to force the unit into Heating, Cooling, and Dehumidification modes. If this option is selected, it applies to all three modes, and all three modes will only be initiated by these contact closures. **If this is configured for YES, set the previous screen to Outdoor Air.** See the VCB-X Remote Contact Control section of the Sequence of Operations in the *VCB-X Controller Field Technical Guide* for more details. **Default is NO**.

## Configuration Screen #9 - SAT Reset Source

```
VCBX Cnfg ID 101
SAT Reset Source
No Reset
Use < Or > To Change
```

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.
- **Remote Voltage**—The SAT Setpoints will be adjusted based on the Remote Supply Air Temperature Voltage Reset Signal.

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 #10 - 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 #11 - Return Sensor Type

```
VCBX Cnfg ID 101
Return Sensor Type
NONE
Use < Or > To Change
```

If this unit has a Return Air Sensor installed, *select* RETURN AIR if it is a temperature sensor only. Select RETURN AIR WITH RH if it is a combination communicating temperature and humidity sensor. **Default is NONE.**

## Configuration Screen #12 - Static Pressure Control

```
VCBX Cnfg ID 101
Static Pr Control
Fan VFD / SZ VAV
Use < Or > To Change
```

This configuration option is available if expansion module EM1 is installed and configured or if using SZ VAV operation. **Default is Fan VFD/SZ VAV.** The options are:

- **None**— This unit is not controlling Duct Static Pressure.
- **Fan VFD / SZ VAV**—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 #13 - Static/Fan Control Rate & Max Increment

```
VCBX Cnfg ID 101
Static/Fan Control
Rate...: 10 s
Max Increment: 5%
```

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**. The Maximum Increment is is the maximum amount the Static Control can change per control rate period. **Default is 5%.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Static/Fan Control Rate | 1 sec | 10 sec | 30 sec |
| Max Increment | 1% | 5% | 30% |

# VCB-X Configuration Screens

## Configuration Screen #14 - Fan Voltage Output

```
VCBX 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 *Duct Static Pressure Output 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**.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Minimum Fan Voltage | 0 | 0 | 10 |
| Maximum Fan Voltage | 0 | 10 | 10 |

## Configuration Screen #15 - Fan Cycle Mode

```
VCBX Cnfg ID 101
Fan Cycle Mode
NO
Use < Or > To Change
```

*Select* 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, *select* NO. **Default is NO**.

## Configuration Screen #16 - Fan Proving

```
VCBX Cnfg ID 101
Fan Proving
NO
Use < Or > To Change
```

*Select* 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. **Default is NO**.

## Configuration Screen #17 - Fan Starting Delay

```
VCBX Cnfg ID 101
Fan Starting
Delay:  -1 s
[-1 = Unit Addr x 5]
```

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. For a MUA unit, this should be set to a minimum of 60 seconds to let the OA Damper open. **Default is -1 second.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Fan Start Delay Timer | -1 Sec | -1 Sec | 240 Sec |

## Configuration Screen #18 - Purge Mode Delay

```
VCBX Cnfg ID 101
Purge Mode
Delay: 10 Sec
[  0 - 900 Seconds  ]
```

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 Outdoor Air Damper closed and all Cooling and Heating is de-energized. For a MUA unit, this should be set to 0 seconds to prevent a Purge Mode (which is a damper closed operation). **Default is 10 seconds.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Purge Mode Delay | 0 sec | 10 sec | 900 sec |

## Configuration Screen #19 - Heat Type

```
VCBX Cnfg ID 101
Heat Type
No Heat
Use < Or > To Change
```

**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:** This screen does not apply to Heat Pump Units. For Heat Pump Units, use *Configuration Screen #39 - Auxiliary Heating* for configuration.

## Configuration Screen #20 - 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**.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Minimum Position Volts | 0 | 0 | 10 |
| Maximum Position Volts | 0 | 10 | 10 |

## Configuration Screen #21 - Cool Type

```
VCBX Cnfg ID 101
    Cool Type
    No Cooling
Use < Or > To Change
```

**Default is No Cooling**. Available options are:

- **No Cooling**—The unit has no Cooling.
- **Staged Only**—On/Off Chilled Water or fixed stage(s) DX Cooling only.
- **Mod Only**—Modulating Chilled Water or Digital Scroll Compressors.
- **Mod Then 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 #22 - Digital Compressor For Modulating Cooling

```
VCBX Cnfg ID 101
Digital Comp For
  Mod Cool: NO
Use < Or > To Change
```

*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 #23 - 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. This configuration only applies to Chilled Water applications. **Defaults are 0 VDC Min and 10 VDC Max**.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Minimum Position Volts | 0 | 0 | 10 |
| Maximum Position Volts | 0 | 10 | 10 |

## Configuration Screen #24 - Mechanical Heat/ Cool Alarm Delay

```
VCBX Cnfg ID 101
  Mech Heat/Cool
Alarm Delay: 15 Min
```

*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.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Mechanical Heat/Cool Failure Alarm Delay | 0 Min | 15 Min | 240 Min |

# VCB-X Configuration Screens

## Configuration Screen #25 - Economizer Control Type

```
VCBX Cnfg ID 101
Econo Control Type
No Economizer
Use < Or > To Change
```

**Default is No Economizer.** Available options are:

- **No Economizer**
- **Standard Economizer**
- **IAQ Economizer (Economizer with $CO_2$ Override)**

Select Standard Economizer if the HVAC Mode Enable Source is set to Space Temperature with High Percentage OA.

## Configuration Screen #26 - Title 24 Economizer

```
VCBX Cnfg ID 101
Title 24
Economizer: NO
Use < Or > To Change
```

If this unit has Title 24 Economizer operation, this option should be configured as YES. **Default is NO.**

## Configuration Screen #27 - Economizer in Unoccupied Mode

```
VCBX Cnfg ID 101
Econo Control In
Unoc Mode: NO
Use < Or > To Change
```

*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 #28 - Outdoor Air Sensor

```
VCBX Cnfg ID 101
Outdoor Air Sensor
Installed: YES
Use < Or > To Change
```

If this unit has any type of an Outdoor Air Sensor installed, this option should be configured as YES. **Default is YES.**

## Configuration Screen #29 - E-BUS Outdoor Air/ RH Sensor

```
VCBX Cnfg ID 101
E-Bus OAT/RH
Sensor: NO
Use < Or > To Change
```

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 #30 - Economizer Enable Source

```
VCBX Cnfg ID 101
Economizer Enable Source
Drybulb
Use < Or > 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 #31 - Economizer Control Loop Rate & Proportional Window

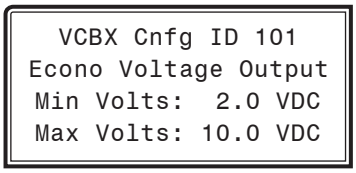
```
VCBX Cnfg ID 101
Economizer Control
Rate: 10 s
Prop Window: 10.0ºF
```

The Economizer Control rate is the time period between changes to the Economizer position. **Default is 10 seconds.** The Economizer Control 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˚ Proportional Window, if the Supply Air Temperature is 5˚ or more from setpoint, the

signal change will be 10% per time period. At 4˚ difference, the signal change will be 8% per time period. By the time the difference is 1˚, the signal change will be 2% per time period. With a Proportional Window of 2˚, if you are 2˚ or more from setpoint, the amount of signal change will be 10% per time period, and at 1˚ 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.**Default is 10.0ºF/5.55ºC.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Economizer Control Rate | 1 sec | 10 sec | 30 sec |
| Proportional Window | 1.0ºF<br>0.10ºC | 10.0ºF<br>5.55ºC | 30.0ºF<br>16.6ºC |

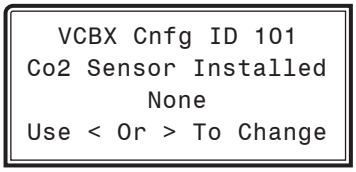
## Configuration Screen #32 - Economizer Voltage Output




*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.**

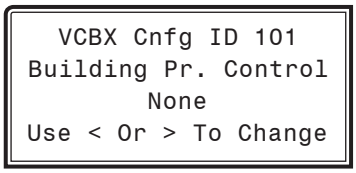
| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Min Economizer Voltage | 0 | 2 | 10 |
| Max Economizer Voltage | 0 | 10 | 10 |

## Configuration Screen #33 - $CO_2$ Sensor Installed




*Select* **Digital E-BUS** if you have an E-BUS $CO_2$ Sensor installed. *Select* **Receive Broadast** if the $CO_2$ Sensor is attached to a separate device that will broadcast the reading, e.g., GPC-XP Controller. **Default is None.**

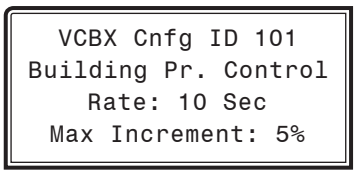
## Configuration Screen #34 - Building Pressure Control




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 #35 - Building Pressure Control Rate & Max Increment




The Building Pressure Control Rate is the time period between changes to the Building Pressure Control signal. **Default is 10 seconds.** The Maximum Increment is the maximum amount the Building Pressure Control can change per control rate period. **Default is 5%.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Building Pressure Control Rate | 1 sec | 10 sec | 30 sec |
| Max Increment | 1% | 5% | 30% |

# VCB-X Configuration Screens

## Configuration Screen #36 - Exhaust Fan Output

```
VCBX Cnfg ID 101
Exh Fan Volts
Min Volts: 0 VDC
Max Volts: 10 VDC
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Minimum Position Volts | 0 | 0 | 10 |
| Maximum Position Volts | 0 | 10 | 10 |

## Configuration Screen #37 - Heat Pump Config

```
VCBX Cnfg ID 101
Heat Pump Config
No Heat Pump
Use < Or > To Change
```

**Default is No Heat Pump**. Available options are:

- **No Heat Pump**—Unit is not a Heat Pump.
- **Air/Air Fail to Heat**—Heat Pump unit activates its Reversing Valve during Cooling operation.
- **Air/Air Fail to Cool**—Heat Pump unit activates its Reversing Valve during Heating operation.
- **WSHP Fail to Heat**—Water Source Heat Pump unit activates its Reversing Valve during Cooling operation.
- **WSHP Fail to Cool**—Water Source Heat Pump unit activates its Reversing Valve during Heating operation.

## Configuration Screen #38 - WSHP Glycol Percentage

```
VCBX Cnfg ID 101
WSHP Glycol
Percentage: 0%
Use < Or > To Change
```

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. **Default is 0%.**

## Configuration Screen #39 - Aux Heat Type Value

```
VCBX Cnfg ID 101
Aux Heat Type
No Aux Heat
Use < Or > To Change
```

If this is a Heat Pump, choose the appropriate Aux Heat option. **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.
- **ModGas Only**—This unit has Modgas which will be used as Auxiliary Heat.

## Configuration Screen #40 - Dehumidification Control

```
VCBX Cnfg ID 101
Dehum. Control:
None
Use < Or > To Change
```

If using Dehumidification choose the appropriate Dehumidification option. **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 #41 - Humidity Control Sensor Type

```
VCBX Cnfg ID 101
Humidity Control
Sensor: Space
Use < Or > To Change
```

*Select* Space, Return, or Outdoor if an E-BUS Humidity Sensor is installed. Can receive a Space Humidity broadcast from a GPC-XP if value in *Configuration Screen #43* is selected as NO. **Default is Space.**

## Configuration Screen #42 - Suction Pressure Sensor Installed

```
VCBX Cnfg ID 101
Suction Pr Sensor
Installed: NO
Use < Or > To Change
```

*Select* YES if you have a Suction Pressure Sensor Installed**. Default is NO.**

## Configuration Screen #43 - E-BUS Space & Humidity Sensor Installed

```
VCBX Cnfg ID 101
E-BUS SPC/RH Sensor
Installed: NO
Use < Or > To Change
```

*Select* YES if you have an E-BUS Space and Humidity Sensor installed**.** Set this to NO if receiving a Space Humidity Broadcast from a GPC-XP Controller. **Default is NO.**

## Configuration Screen #44 - Reheat Type

```
VCBX Cnfg ID 101
Reheat Control
None
Use < Or > 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.** *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 #45 - Defrost Coil Switch

```
VCBX Cnfg ID 101
Defrost Coil Switch
NO
Use < Or > To Change
```

*Select* 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 #46 - Head Pressure Control

```
VCBX Cnfg ID 101
Head Pr. Control:
NO
Use < Or > To Change
```

This configuration option is available if expansion module EM1 has been installed and configured and if Head Pressure Control is required. **Default is NO.**

# VCB-X Configuration Screens

## Configuration Screen #47 - Condenser Fan Outputs

```
VCBX Cnfg ID 101
Cond Fan Max: 100%
Cond Fan Min:  15%
```

If using Head Pressure control, you can set the Max and Min signal percentages on this screen. The EM1 Expansion Module must be installed and configured.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Condenser Fan Max | 0 | 100 | 100 |
| Condenser Fan Min | 0 | 15 | 100 |

## Configuration Screen #48 - Has Water Side Condenser

```
VCBX Cnfg ID 101
Has Water Side Cond.
NO
Use < Or > To Change
```

This configuration option is available if expansion module EM1 has been installed and configured and if using a Water Side Condenser. Select NO if the unit is configured as Water Source Heat Pump. **Default is NO.**

## Configuration Screen #49 - Type of Airflow Station

```
VCBX Cnfg ID 101
Airflow
Station: Paragon
Use < Or > To Change
```

Select the type of Airflow Monitoring Station you are using, if any. Selections are Paragon or Ebtron. Choose Ebtron if using Greentrol. **Default is Paragon**.

## Configuration Screen #50 - Monitor Outdoor Air Airflow

```
VCBX Cnfg ID 101
Monitor OA Airflow
NO
Use < Or > To Change
```

*Select* YES if you have an Airflow Monitoring station measuring the CFM of the Outdoor Air airflow stream of this unit. **Default is NO.**

## Configuration Screen #51 - Control Outdoor Air CFM

```
VCBX Cnfg ID 101
Control Outdoor Air
CFM: NO
Use < Or > To Change
```

*Select* 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 #52 - 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.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Outdoor Air Airflow Duct Size | 0 | 0 | 200.00 |

## Configuration Screen #53 - Monitor Supply Air Airflow

```
VCBX Cnfg ID 101
Monitor SA Airflow
NO
Use < Or > To Change
```

*Select* 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 #54 - 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 |
|---|---|---|---|
| Supply Air Airflow Duct Size | 0 | 0 | 200.00 |

## Configuration Screen #55 - Monitor Return Air Airflow

```
VCBX Cnfg ID 102
Monitor RA Airflow
NO
Use < Or > To Change
```

*Select* 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 #56 - 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.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Return Air Airflow Duct Size | 0 | 0 | 200.00 |

## Configuration Screen #57 - Monitor Exhaust Airflow

```
VCBX Cnfg ID 101
Monitor Exh Airflow
NO
Use < Or > To Change
```

*Select* 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 #58 - 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**.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Exhaust Airflow Duct Size | 0 | 0 | 200.00 |

## Configuration Screen #59 - Morning Warm Up

```
VCBX Cnfg ID 101
Morning Warm Up
None
Use < Or > To Change
```

You can choose between the following Morning Warm Up options. **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 others 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.

## Configuration Screen #60 - AHU Uses Schedule Number

```
VCBX Cnfg ID 101
AHU Uses Schedule
Number: 0
['0' For Internal]
```

The VCB-X has an internal schedule. If you want the VCB-X to use its own internal schedule, *enter* **<0>** for Internal.

## VCB-X Configuration Screens

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**.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| AHU Uses Schedule | 0 | 0 | 8 |

### Configuration Screen #61 - Daylight Savings Adjustment

```
VCBX Cnfg ID 101
Daylight Adjustment
Start Date: 0000
Stop  Date: 0000
```

If you are in a time zone that does not have daylight savings time or do not want to use this feature, leave these fields blank. Otherwise, *enter* the starting date for Daylight Savings time in the Start Date field and the ending date in the Stop Date field. For example, March 11 = 0311 (DDMM). **Default is 0000**.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Start Date | 0 | 0 | 1231 |
| Stop Date | 0 | 0 | 1231 |

**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.

### Configuration Screen #62 - Trend Log Rate

```
VCBX Cnfg ID 101
Trend Log
Rate: 15 Min
```

An internal Trend Log is constantly updated at a rate equal to this value. Trend Logs can only be accessed with Prism 2 software. **Default is 15 minutes.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Trend Log Rate | 1 Min | 15 Min | 120 Min |

### Configuration Screen #63 - Emergency Shutdown

```
VCBX Cnfg ID 101
Emergency Shutdown
NO
Use < Or > To Change
```

*Select* 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.**

### Configuration Screen #64 - Dirty Filter

```
VCBX Cnfg ID 101
Dirty Filter
NO
Use < Or > To Change
```

*Select* 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.**

### Configuration Screen #65 - Broadcast OA Temp

```
VCBX Cnfg ID 101
Broadcast OA Temp
NO
Use < Or > 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. *Select* YES for Broadcast Outdoor Temperature. **Default is NO**.

### Configuration Screen #66 - Broadcast OA RH

```
VCBX Cnfg ID 101
Broadcast OA RH
NO
Use < Or > 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. *Select* YES for Broadcast Outdoor RH. **Default is NO**.

## Configuration Screen #67 - Broadcast Building Pressure

```
VCBX Cnfg ID 101
Broadcast Build. Pr.
NO
Use < Or > To Change
```

The VCB-X can broadcast Building Pressure from this unit to any other unit requiring this value. *Select* YES for Broadcast Building Pressure. **Default is NO**.

## Configuration Screen #68 - Broadcast to Boxes

```
VCBX Cnfg ID 101
Broadcast to Boxes
NO
Use < Or > To Change
```

The VCB-X can broadcast all applicable information and commands to the VAV Boxes. *Select* YES for Broadcast to Boxes. **Default is NO**.

## Configuration Screen #69-#72 - 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Cooling Stage Up | 3 Min | 3 Min | 15 Min |
| Cooling Stage Down | 1 Min | 1 Min | 15 Min |
| Cooling Min Run Time | 5 Min | 5 Min | 15 Min |
| Cooling Min Off Time | 3 Min | 3 Min | 15 Min |
| Heating Stage Up | 3 Min | 3 Min | 15 Min |
| Heating Stage Down | 1 Min | 1 Min | 15 Min |
| Heating Min Run Time | 2 Min | 5 Min | 15 Min |
| Heating Min Off Time | 1 Min | 1 Min | 15 Min |

## Configuration Screen #73 - Heat Pump Delays - Aux Heat

```
VCBX Cnfg ID 101
Heat Pump Delays
Aux Heat..: 3 Min
[  1 - 60 Minutes  ]
```

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.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Aux Heat Delay | 0 Min | 3 Min | 60 Min |

## Configuration Screen #74 - Heat/Cool Changeover Delay

```
VCBX Cnfg ID 101
Heat Cool Changeover
Delay: 5 Min
```

*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.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Heat/Cool Changeover Delay | 0 Min | 5 Min | 20 Min |

# VCB-X Configuration Screens

## Configuration Screen #75 - Return Air Bypass Control

```
VCBX Cnfg ID 101
Return Air Bypass
   Control: No
Use < Or > To Change
```

*Select* Yes if your HVAC unit requires Return Air Bypass Control for Dehumidification Reheat. **Default is No**. You must have the EM2 Expansion Module installed and configured for this feature.

## Configuration Screen #76 - Morning Cool-Down Type

```
VCBX Cnfg ID 101
Morning Cool-Down
      None
Use < Or > To Change
```

You can choose between the following Morning Cool-Down options. **Default is None.** Available options are:

- **None**—There is no Cool-Down required.
- **Stand Alone**—The VCB-X Controller is not communicating to Orion VAV Box controls, but a Cool-Down Relay can be configured to signal boxes by others 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 Cool-Down. 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 Cool-Down. This maximum position is configured in the VAV Box Controller.

## Configuration Screens #77-81 - VCB-X Relay Configuration Screens

```
VCBX Cnfg ID 101
On-Board Relay (2-6)
      Not Used
Use < Or > To Change
```

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 5** for Relay descriptions):

- **Not Used (Default)**
- **Cooling Stage**
- **Condenser #1**
- **HP Water Valve**
- **HP Reversing Valve**
- **HP Emergency Heat**
- **Mod Cool Enable**
- **Reheat**
- **Low Ambient**
- **Economizer**
- **Occupied Mode**
- **Alarm Active**
- **Digital Compressor**
- **Heating Stage**
- **Condenser #2**
- **HP Compressor**
- **HP Aux Heat**
- **Mod Heat Enable**
- **Warmup / Cooldown**
- **Preheat**
- **Exhaust Fan**
- **Heat Wheel**
- **Override Mode**

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.**

## Configuration Screens #82-86 - EM1 Relay Configuration Screens

```
VCBX Cnfg ID 101
EM1 Relay (1-5)
      Not Used
Use < Or > To Change
```

EM1 Relays #1-#5 are configurable for the following options (See **Table 5** for Relay descriptions):

- **Not Used (Default)**
- **Cooling Stage**
- **Condenser #1**
- **HP Water Valve**
- **HP Reversing Valve**
- **HP Emergency Heat**
- **Mod Cool Enable**
- **Reheat**
- **Low Ambient**
- **Economizer**
- **Occupied Mode**
- **Alarm Active**
- **Digital Compressor**
- **Heating Stage**
- **Condenser #2**
- **HP Compressor**
- **HP Aux Heat**
- **Mod Heat Enable**
- **Warmup / Cooldown**
- **Preheat**
- **Exhaust Fan**
- **Heat Wheel**
- **Override Mode**

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.**

## Configuration Screens #87-99 - E-BUS 12 Relay Configuration Screens

```
VCBX Cnfg ID 101
12 Rly Bd (1-12)
    Not Used
Use < Or > To Change
```

The E-BUS 12 Relay Expansion Board Relays #1-#12 are configurable for the following options (See **Table 5** for Relay descriptions):

- **Not Used (Default)**
- **Cooling Stage**
- **Digital Compressor**
- **Heating Stage**
- **Condenser #1**
- **HP Water Valve**
- **HP Reversing Valve**
- **HP Emergency Heat**
- **Mod Cool Enable**
- **Reheat**
- **Low Ambient**
- **Economizer**
- **Occupied Mode**
- **Alarm Active**
- **Condenser #2**
- **HP Compressor**
- **HP Aux Heat**
- **Mod Heat Enable**
- **Warmup / Cooldown**
- **Preheat**
- **Exhaust Fan**
- **Heat Wheel**
- **Override Mode**

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.**

| No. | Relay Description | Details |
|---|---|---|
| 1 | Digital Compressor | Configured for a Digital Compressor. |
| 2 | Cooling Stage | Configured for each fixed stage of cooling (except heat pump compressor). |
| 3 | Heating Stage | Configured for each fixed stage of heating. |
| 4-5 | Condenser #1<br>Condenser #2 | Configured for Condenser Fan/Valve operation. This relay(s) will be active anytime the respective compressors are active, except if the unit is in Heat Pump Defrost Mode. |
| 6 | Heat Pump Water Valve | On a Water Source Heat Pump, this relay will be active anytime compressors are active. |
| 7 | Heat Pump Compressor | Configured for a Fixed Heat Pump Compressor stage. |
| 8 | Reversing Valve | Configured for the Reversing Valve of a heat pump unit. |
| 9 | Aux Heat | Configured for a fixed stage of Aux Heat in a heat pump unit. |
| 10 | Emergency Heat | Configured for a fixed stage Emergency Heat in a heat pump unit. |
| 11 | Mod Heat Enable | Configure if a 0-10 VDC Modulating Heat source needs a relay to enable it. |
| 12 | Mod Cool Enable | Configure if a 0-10 VDC Modulating Cool source needs a relay to enable it. |
| 13 | Morning Warm-Up/ Cool-Down (VAV Boxes) | Configure (1) Relay for Morning Warm-Up/Cool-Down when Non-Orion VAV/Zone Controllers are used. |
| 14 | Reheat | Configure (1) Relay for On/Off Reheat when used. |
| 15 | Pre-Heat | Configure for Pre-Heat operation. |
| 16 | Low Ambient | Configure for Low Ambient operation. |
| 17 | Exhaust Fan | Configure (1) Relay for enabling exhaust fan when Building Pressure Control is used. |
| 18 | Economizer Active | If configured, this relay will energize if unit is in Economizer mode and the damper has moved 5% above its Economizer Minimum Setpoint position. |
| 19 | Heat Wheel | Configure (1) Relay that turns heat wheel on when in Occupied operation and turns heat wheel off when in Economizer Mode. |
| 20 | Occupied Active | If configured, this relay will energize whenever the unit is in the Occupied Mode. |
| 21 | Override Active | If configured, this relay will energize anytime the space sensor Push-button override is active. |
| 22 | Alarm Active | If configured, this relay will energize anytime a VCB-X alarm is active. |

**Table 5: User-Configurable Relay Outputs**

# VCB-X Setpoint Screens

## 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:

## Setpoints - General Procedures

### Modular Service Tool Instructions

From any menu screen, *press* **<SETPOINTS>**. The *Unit Selection Screen,* shown below, will appear requesting that you enter the unit ID number.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

*Enter* the correct unit ID number of the VCB-X Controller you want to change Setpoints for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**. You will then see Setpoint Screen #1. *Press* **<ENTER>** to save entered data and *press* **<⇩>** to scroll through the screens.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

### System Manager SD Instructions

From any Main screen, *press* **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Change Setpoints
Configure Unit
Save/Copy/Restore
```

Scroll to the 'Change Setpoints' option and *press* **<ENTER>**. This will take you to the first Setpoints Screen shown below.

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

```
VCBX Spts ID 101
Occupied HVAC Spts
 Cooling: 75.0ºF
 Heating: 70.0ºF
```

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).

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| **HVAC Mode Setpoints Cooling** | **1ºF (-17.2ºC)** | **75ºF (24ºC)** | **110ºF (43.3ºC)** |
| **HVAC Mode Setpoints Heating** | **1ºF (-17.2ºC)** | **70ºF (21ºC)** | **110ºF (43.3ºC)** |

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

```
VCBX Spts ID 101
Hood On HVAC Spts
 OAT Cool: 75.0ºF
 OAT Heat: 70.0ºF
```

These setpoints are used for three different applications.

**CAV/MUA Dual Mode (Hood On/Off)**—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 Hood On setpoints become the Outdoor Air Temperature Mode Enable Setpoints.

When the exhaust hoods are turned off and the Hood On contact opens, the unit reverts back to Space or Return Air Temperature Control and uses the Occupied HVAC Setpoints from the previous screen.

# VCB-X Setpoint Screens

**Space Temperature Control of High Percentage Outside Air Units**—This option allows for Space Temperature control of 100% Outside Air MUA Units or units with a high percentage of Outdoor Air (normally 50% or greater). For this application you would configure "Space Temperature w/High OA %" for the Controlling Sensor option. The intent of this sequence is to allow Space Temperature control of the unit while preventing the dumping of hot or cold outside air into the space during the Space Vent Mode of operation.

Once the Space Temperature is satisfied, before switching to Vent Mode, the controller compares the Outside Air Temperature to these Hood On HVAC setpoints to determine if a continued demand for heating or cooling is required to prevent dumping. If there is no demand, the VCB-X Controller switches to Vent Mode. If the Outside Air Temperature is greater than the Hood On HVAC Cooling Setpoint or less than the Hood On HVAC Heating Setpoint, plus the Occupied Deadband, the VCB-X Controller will continue mechanical cooling or heating operation and stage it as necessary to maintain the Vent Mode Supply Air Setpoint (Calculated to be halfway between the Mode Enable Setpoints). A call for Heating or Cooling from the Space Sensor will cancel this tempering operation.

**Supply Air Tempering**—In the VAV Supply Air Tempering application (see the *VCB-X Controller Technical Guide* for full details), the unit will enter the Cooling and Heating Modes based on the outdoor temperature. The outdoor Heating and Cooling Setpoints are configured using the Hood On OAT Cooling and Heating Setpoints on this screen. In this application, the economizer can operate in any mode, if necessary, to achieve the supply air setpoint. Night Setback Heating and Morning Warm Up are both controlled to the Warm Up Supply Air Setpoint.

**NOTE:** For this Supply Air Tempering application, the Heating Supply Air Setpoint on *Setpoint Screen #21* should be set at least 2°F **below** the Cooling Supply Air Setpoint.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Hood On OAT Cool | 1ºF (-17.2ºC) | 75ºF (24ºC) | 110ºF (43.3ºC) |
| Hood On OAT Heat | 1ºF (-17.2ºC) | 70ºF (21ºC) | 110ºF (43.3ºC) |

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

```
VCBX Spts ID 101
Unoccupied Offsets
 Cooling: 30.0ºF
 Heating: 30.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Unoccupied Offsets Cooling | 0ºF (0ºC) | 30ºF (16.6ºC) | 30ºF (16.6ºC) |
| Unoccupied Offsets Heating | 0ºF (0ºC) | 30ºF (16.6ºC) | 30ºF (16.6ºC) |

## Setpoint Screen #4 - Mode Deadband

```
VCBX Spts ID 101
Mode Deadband
Setpt: 1.0ºF
```

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

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| HVAC Mode Select Deadband | 1ºF (.6ºC) | 1ºF (.6ºC) | 10ºF (5.5ºC) |

## 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Space Sensor Slide Adjust | 0ºF (0ºC) | 0ºF (0ºC) | 10ºF (5.5ºC) |

## Setpoint Screens #6, #7 & #8 - Flush Mount Space Sensor Calibrate Slide Adjust

```
VCBX Spts ID 101
Calibrate Slide Adj
 Put At Up Pos: XXX
Enter # Shown:  XXX
```

The use of this screen is optional and is not required for the sensor to function. Once the slide adjust value is configured on Setpoint Screen #5, this screen is used to calibrate the slider to accurately provide that offset adjustment in the up position. The value on line 3 will change when the slider moves. Once the slider is in the up position, wait for the value on line 3 to stop changing. Once it stops changing, enter this value on line 4.

```
VCBX Spts ID 101
Calibrate Slide Adj
 At Middle Pos: XXX
Enter # Shown:  XXX
```

This screen is used to calibrate the value for the slider when it is in the middle position. The value on line 3 will change when the slider moves. Once the slider is in the middle position, wait for the value on line 3 to stop changing. Once it stops changing, enter this value on line 4.

```
VCBX Spts ID 101
Calibrate Slide Adj
  At Down Pos: XXX
Enter # Shown:  XXX
```

This screen is used to calibrate the value for the slider when it is in the down position. The value on line 3 will change when the slider moves. Once the slider is in the down position, wait for the value on line 3 to stop changing. Once it stops changing, enter this value on line 4.

## Setpoint Screen #9 - 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.

If using a Digital Space Sensor, pushing the Override Button momentarily will initiate the Override Mode.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Space Sensor Push-Button Override Duration | 0.0 Hr | 2.0 Hr | 8.0 Hr |

## Setpoint Screen #10 - Controlling Sensor High Alarm Offset

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

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Controlling Sensor High Alarm Offset | 0°F (0°C) | 30°F (16.6°C) | 50°F (27.7°C) |

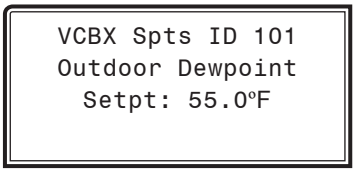
## Setpoint Screen #11 - Controlling Sensor Low Alarm Offset

```
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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Controlling Sensor Low Alarm Offset | 0°F (0°C) | 30°F (16.6°C) | 50° F (27.7°C) |

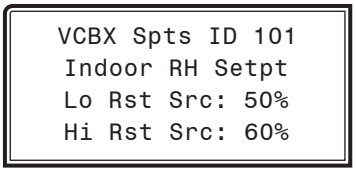
## Setpoint Screen #12 - Outdoor Dewpoint Setpoint




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 2°F above this setpoint. If the humidity falls 2°F below this setpoint, the unit will leave the Dehumidification Mode.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Outdoor Dewpoint Setpoint | 35ºF (1.7ºC) | 55ºF (12.8ºC) | 80ºF (26.6ºC) |

## Setpoint Screen #13 - Indoor RH Setpoint Low and High Reset Source




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.

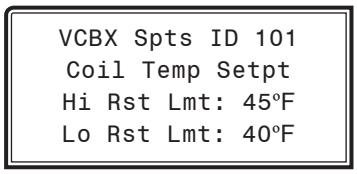
If no reset of the Coil Temperature Setpoint is desired, set the High Reset Source (Hi Rst Src) at the same value as the Low Reset Source. If reset of the Coil Temperature Setpoint is desired, when the Indoor Humidity rises above the Low Reset Source, Dehumidification will be initiated and the Coil Temperature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

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Indoor RH Setpoint Low Reset Source | 0% | 50% | 100% |
| Indoor RH Setpoint High Reset Source | 0% | 60% | 100% |

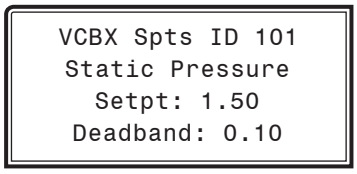
## Setpoint Screen #14 - Coil (Saturation) Temperature High and Low Reset Setpoints




Based on the Indoor Humidity Reset Range configured on the previous screen, the Coil Suction Temperature Setpoint can be reset between the High Reset Limit (Hi Rst Lmt) and Low Reset Limit (Lo Rst Lmt) configured on this screen during the Dehumidification Mode. See the description of this reset function on the previous screen. If the High Reset Limit and the Low Reset Limit are set at the same value, no Coil Temperature Reset will occur.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Coil Temp Setpoint High Reset Limit | 35ºF (1.7ºC) | 45ºF (7.2ºC) | 70ºF (21.1ºC) |
| Coil Temp Setpoint Lo Reset Limit | 35ºF (1.7ºC) | 40ºF (4.4ºC) | 70ºF (21.1ºC) |

## Setpoint Screen #15 - Static Pressure Setpoint and Deadband




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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Static Pressure Spt | 0.10″ WG | 1.50″ WG | 3.0″ WG |
| Deadband | 0.01″ WG | 0.10″ WG | 0.50″ WG |

## Setpoint Screen #16 - VFD Speed Minimums Cool/Vent Modes

```
VCBX Spts ID 101
VFD Speed Limits
 Min Cool: 60%
 Min Vent: 60%
```

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 #19 and 20. 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.

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

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Minimum Cool | 0% | 30% | 100% |
| Minimum Vent | 0% | 20% | 100% |

## Setpoint Screen #17 - VFD Speed Limits Min/ Max Heat

```
VCBX Spts ID 101
VFD Speed Limits
 Min Heat:  60%
 Max Heat: 100%
```

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 #22 and 23. 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Minimum Heat | 0% | 60% | 100% |
| Maximum Heat | 0% | 100% | 100% |

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

```
VCBX Spts ID 101
Supply Air Cooling
Setpt.......: 55.0°F
Hi Rst Limit: 55.0°F
```

If no Reset Source has been configured in Configuration Screen #9, then this Setpoint will be the Supply Air Temperature Cooling Setpoint. Line 4 will be not be used. If a Reset Source has been configured in Configuration Screen #9, then Line 4 will be used. Reset is always upward from the SAT setpoint to the Reset Limit setpoint. So, the SAT will be the lowest temperature the Supply Air Setpoint can be reset to and Hi Reset Limit will be the highest temperature the Supply Air Setpoint can be reset to. The Cooling 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).

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| SAT Cooling Setpoint | 30°F (-1.1°C) | 55°F (12.8°C) | 80°F (26.6°C) |
| Cooling Reset Limit | 0°F (-17.7°C) | 55°F (12.8°C) | 100°F (37.7°C) |

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

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

If no SAT Reset Source has been configured in Configuration Screen #9 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 #9, 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 #18.

Please note that the SAT value cannot be changed on this screen; it is simply displayed from what was entered on 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 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 #20, 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 #20.*

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

If this is was configured for Single Zone VAV application on Configuration Screen #7, 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 #16) 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 #20.*

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| If Hi Space | 1ºF (-17.2ºC) | 75ºF (24ºC) | 150ºF (65.5ºC) |

## Setpoint Screen #20 - Cool Reset Source Setpoints - Low Space/High Reset/VFD

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

If no SAT Reset Source has been configured in Configuration Screen #9 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 #9, 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 #18.

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 #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 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 #19, 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:**

**Space Temp (Hi Spc) = 75˚F  SAT Stpt (SAT) = 55˚F**

**Space Temp (Low Spc) = 72˚F  SAT Stpt (Hi Rst) = 65˚F**

**VFD Percentage Cooling Reset of SAT Setpoint:**

**VFD Percentage (Hi VFD) = 100%  SAT Stpt (SAT) = 55˚F**

**VFD Percentage (Low VFD) = 30%  SAT Stpt (Hi Rst) = 65˚F**

```
  VCBX Spts ID 101
 SZ VAV Fan Cool Rst
If Low Spc:  70.0ºF
Then VFD:     30%
```

If this unit was configured for Single Zone VAV application on Configuration Screen #7, 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 previous screen. Upon entering the Cooling Mode, the fan will start at the Min Cooling VFD

Speed (entered on Setpoint Screen #16) 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 #16. 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 #16.

**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%**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| If Low Space | -30ºF (-23.3ºC) | 70ºF (21ºC) | 150ºF (65.5ºC) |

## Setpoint Screen #21 - 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 #9, 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 #9, then Line 4 will be used. Reset is always upward from the SAT setpoint to the Hi Reset 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).

**NOTE:** For a Supply Air Tempering application, the Heating Supply Air Setpoint should be set at least 2°F below the Cooling Supply Air Setpoint.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| SAT Heating Spt | 40ºF (4.5ºC) | 120ºF (48ºC) | 240ºF (115.5ºC) |
| Reset Limit Spt | 0ºF (-17.7ºC) | 120ºF (48ºC) | 250ºF (121.1ºC) |

## Setpoint Screen #22 - Heat Reset Source Setpoints - High Space/SAT/VFD

```
VCBX Spts ID 101
Heat Rst Source Spts
If Hi Spc:  75.0ºF
Then SAT:   55
```

If no SAT Reset Source has been configured in Configuration Screen #9 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 #9, 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 #18. The exception is for "If Hi VFD". When using VFD Reset in the Heating Mode, the "Hi VFD" value will correspond to the Supply Air Heating "Hi Rst" value entered on Setpoint Screen #18.

Please note that the SAT (or HiRst) value cannot be changed on this screen; it is simply displayed from what was entered on the Setpoint Screen #21. 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 Heating 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 #23, the Supply Air Cooling Setpoint will be proportionally reset from the SAT Setpoint to the Hi Rst Limit Setpoint.

*See Heating Supply Air Reset examples under Setpoint Screen #23.*

```
VCBX Spts ID 101
SZ VAV Fan Heat Rst
If Hi Spc:  75.0ºF
Then VFD:    50%
```

If this unit was configured for Single Zone VAV application on Configuration Screen #7, this screen will appear. In the Heating Mode, the Supply Fan VFD speed will proportionally modulate as the Space Temperature falls within the range set on this screen and the next screen. Upon entering the Heating Mode, the fan will start at the Min Heating VFD Speed (entered on Setpoint Screen #17) and modulate up to the Max Heat VFD Speed (entered on Setpoint Screen #17) 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 #17.

*See Single Zone VAV Reset example under Setpoint Screen #23.*

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| If Hi Space | 1ºF (-17.7ºC) | 75ºF (24ºC) | 150ºF (65.5ºC) |

## Setpoint Screen #23 - Heat Reset Source Setpoints - Low Space/High Reset/VFD

```
  VCBX Spts ID 101
Heat Rst Source Spts
If Low Spc:  70.0ºF
Then Hi Rst:  55ºF
```

If no SAT Reset Source has been configured in Configuration Screen #9 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 #9, 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 #18. 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 Setpoint Screen #18.

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 #21. 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 highest 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 #22, 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** **SAT Stpt (SAT) = 90˚F**

**Space Temp (Low Spc) = 68˚F** **SAT Stpt (Hi Rst) = 120˚F**

**VFD Percentage Heating Reset of SAT Setpoint:**

**VFD Percentage (Hi VFD) = 100%** **SAT Stpt (SAT) = 120˚F**

**VFD Percentage (Low VFD) = 30%** **SAT Stpt (Hi Rst) = 90˚F**

```
  VCBX Spts ID 101
 SZ VAV Fan Heat Rst
If Low Spc:  70.0ºF
Then VFD:      90%
```

If this unit was configured for Single Zone VAV application on Configuration Screen #7, this screen will appear. In the Heating 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 Heating Mode, the fan will start at the Min Heating VFD Speed (entered on Setpoint Screen #17) and modulate the Max Heat VFD Speed (entered on Setpoint Screen #17) as the Space Temperature falls from the Hi Spc Setpoint (entered on the previous screen) to the Low Spc Setpoint entered on this screen. So, on this screen the Low Spc Setpoint should correspond to the VFD Max Heat Setpoint from Setpoint Screen #17. 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 Max Heat VFD Speed on Setpoint Screen #17.

**Single Zone VFD Heating Reset Example:**

**Space Temp (Hi Spc) = 71˚F** **VFD Speed (Then VFD) = 50%**

**Space Temp (Low Spc) = 68˚F** **VFD Speed (Then VFD) = 90%**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| If Low Space | -30ºF (-34.4ºC) | 70ºF (21ºC) | 150ºF (65.5ºC) |

## Setpoint Screen #24 - Stage Off Window - Cooling/Heating

```
  VCBX Spts ID 101
Stage Off Window
 Cooling: 5.0ºF
 Heating: 5.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Stage Off Window Cooling | 1ºF (.6ºC) | 5ºF (2.8ºC) | 30ºF (16.6ºC) |
| Stage Off Window Heating | 1ºF (.6ºC) | 5ºF (2.8ºC) | 50ºF (27.7ºC) |

## Setpoint Screen #25 - Mod Heat Proportional Window and Time Period

```
  VCBX Spts ID 101
      Mod Heat
Prop Window: 10.0ºF
Time Period: 10.0s
```

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˚ Proportional Window, if the Supply Air Temperature is 5˚ or more from setpoint, the signal change will be 10% per time period. At 4˚ difference, the signal change will be 8% per time period. By the time the difference is 1˚, the signal change will be 2% per time period. With a Proportional Window of 2˚, if you are 2˚ or more from setpoint, the amount of signal change will be 10% per time period, and at 1˚ 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Mod Heat Proportional Window | .1ºF (.1ºC) | 10ºF (5.5ºC) | 30ºF (16.6ºC) |
| Mod Heat Time Period | 5 sec | 10 sec | 240 sec |

## Setpoint Screen #26 - Mod Cool Proportional Window and Time Period

```
VCBX Spts ID 101
    Mod Cool
Prop Window: 10.0ºF
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 ˚F the Supply Air Temperature is from setpoint. The maximum signal change per time period is 10% when the Supply Air Temperature is the full Proportional Window amount from setpoint. So, with a 5˚ Proportional Window, if the Supply Air Temperature is 5˚ or more from setpoint, the signal change will be 10% per time period. At 4˚ difference, the signal change will be 8% per time period. By the time the difference is 1˚, the signal change will be 2% per time period. With a Proportional Window of 2˚, if you are 2˚ or more from setpoint, the amount of signal change will be 10% per time period, and at 1˚ 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Mod Cool Proportional Window | .1ºF (.1ºC) | 10ºF (5.5ºC) | 30ºF (16.6ºC) |
| Mod Cool Time Period | 5 sec | 30 sec | 240 sec |

## Setpoint Screen #27 - 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Cooling Head Pressure Setpoint | 240 PSI | 315 PSI | 420 PSI |
| Reheat Head Pressure Setpoint | 240 PSI | 400 PSI | 420 PSI |

## Setpoint Screen #28 - Economizer Enable Setpoint

```
VCBX Spts ID 101
Economizer Enable
 Setpt:  55.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Economizer Enable | -30ºF (-34.4ºC) | 55ºF (12.8ºC) | 80ºF (26.6ºC) |

## Setpoint Screen #29 - 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Economizer Min Position | 0% | 10% | 100% |

## Setpoint Screen #30 - Maximum Economizer Position in Heat Mode

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

If using Supply Air Tempering, 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 $CO_2$ Setpoint.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| **Maximum Economizer Position in Heat Mode** | **0%** | **50%** | **100%** |

## Setpoint Screen #31 - Minimum Outdoor Airflow Setpoint and Deadband

```
  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 controls the rate of change for the damper signal. As OA CFM moves further from setpoint within this window, the damper makes a larger change.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| **Minimum Outdoor Airflow Setpoint** | **0.10 kCFM** | **2.00 kCFM** | **200 kCFM** |
| **Deadband** | **10 CFM** | **200 CFM** | **9999 CFM** |

## Setpoint Screen #32 - Economizer Maximum Position in High $CO_2$ 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 $CO_2$ 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| **Maximum Economizer Position In High $CO_2$** | **Economizer Min Position** | **50%** | **100%** |

## Setpoint Screen #33 - $CO_2$ Setpoints Min/Max

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

The Min $CO_2$ Setpoint is the threshold $CO_2$ level at which the Economizer Min Damper Position (Setpoint Screen #29) will begin to be reset higher. The Max $CO_2$ Setpoint is the $CO_2$ level at which the Economizer Min Damper Position will be reset to the Econo Max Pos In High $CO_2$ (Setpoint Screen #32). In between those $CO_2$ levels, the Economizer Minimum Position will be proportionally reset between the values set in Setpoint Screens #29 and #32.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| **Minimum $CO_2$ Level** | **0 PPM** | **900 PPM** | **2000 PPM** |
| **Maximum $CO_2$ Level** | **0 PPM** | **1000 PPM** | **2000 PPM** |

## Setpoint Screen #34 - $CO_2$ 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

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| **Altitude Setpoint** | **0 Feet** | **1000 Ft.** | **15,000 Ft.** |

## Setpoint Screen #35 - 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 Modulating Signal will modulate towards 0% as it attempts to maintain the Building Pressure Setpoint. The Exhaust Fan Relay remains energized as long as 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 $CO_2$ 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.

| Description | Min. | Default | Max. |
|---|---|---|---|
| Building Pressure Spt | -0.20” WG | 0.02” WG | 0.20” WG |
| Building Pressure Deadband | 0.01” WG | 0.01” WG | 0.10” WG |

## Setpoint Screen #36 - OAT Lockouts - Comp Cool/Comp Heat

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

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| OAT Lockout Compressor Cooling | -30ºF (-34.4ºC) | 50ºF (10ºC) | 100ºF (37.7ºC) |
| OAT Lockout Compressor Heating | -30ºF (-34.4ºC) | 35ºF (1.6ºC) | 100ºF (37.7ºC) |

## Setpoint Screen #37 - OAT Lockouts - Heat

```
VCBX Spts ID 101
  OAT Lockouts
Heat: 90.0ºF
```

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

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| OAT Lockouts Heating | -30ºF (34.4ºC) | 90ºF (32.2ºC) | 150ºF (65.5ºC) |

# VCB-X Setpoint Screens

## Setpoint Screen #38 - Supply Air Cutoffs - Cooling/Heating

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

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Cooling SAT Cutoff | 0ºF (-17.7ºC) | 40ºF (4.5ºC) | 100ºF (37.7ºC) |
| Heating SAT Cutoff | 0ºF (-17.7ºC) | 150ºF (65.5ºC) | 250ºF (121.1ºC) |

## Setpoint Screen #39 - Hot Water Valve Protection Position

```
VCBX Spts ID 101
Hot Water Valve
Protection POS:  0%
```

If the Supply Fan is on and the Supply Air Temperature (SAT) falls below the Low SAT Cutoff Setpoint for 1 minute, the Hot Water Valve will move to this position. If the SAT rises 5°F above the Low SAT Cutoff, the valve will return to normal operation. If the SAT remains below the Low SAT Cutoff Setpoint for 10 minutes, the unit will shut down and a Low SAT Cutoff Alarm will be generated.

If the Supply Fan is off or during Emergency Shutdown and the Outdoor Air Temperature (OAT) falls below the Low Ambient Setpoint, the Hot Water Valve will move to this position. If the OAT rises back above the Low Ambient Setpoint, the valve will return to its normal position.

If this setpoint is left at the default value of 0%, then the controller will not initiate this protection sequence. **For SCR heat this should be left at 0%.**

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Hot Water Valve Protection Position | 0% | 0% | 100% |

## Setpoint Screen #40 - Preheat Relay Setpoint

```
VCBX Spts ID 101
Preheat Relay
Setpt:  30.0ºF
```

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 Mode and the HVAC unit's fan is running, the Pre-Heater relay will activate. This setpoint will also be used to enable the Preheater if the PREHEAT-X Controller is being used in conjunction with the VCB-X Controller. IF the PREHEAT-X Controller is being used with the VCB-X Controller, a relay on the VCB-X cannot also be configured as Preheat and energize for Preheat function.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Preheat Setpoint | -30ºF (-34.4ºC) | 30ºF (-1.1ºC) | 70ºF (21.1ºC) |

## Setpoint Screen #41 - Low Ambient Setpoint

```
VCBX Spts ID 101
Low Ambient
Setpt:  30.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Low Ambient Setpoint | -30ºF (-34.4ºC) | 30ºF (-1.1ºC) | 70ºF (21.1ºC) |

## Setpoint Screen #42 - 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 #43.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Heat Pump Defrost Interval | 10 Min | 30 Min | 120 Min |

## Setpoint Screen #43 - 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 (*Setpoint Screen #42*). 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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Adaptive Defrost Adj. | 0 Min | 0 Min | 30 Min |

## Setpoint Screen #44 - Heat Wheel Defrost Temperature Setpoint

```
VCBX Spts ID 101
Heat Wheel Defrost
Temp Setpt: 30ºF
```

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

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Heat Wheel Defrost | 0ºF (0ºC) | 30ºF (-1.1ºC) | 50ºF (10ºC) |

## Setpoint Screen #45 - Morning Warm Up or Cool Down Temp

```
VCBX Spts ID 102
Morning WarmUp
Max Length.:   60 Min
Target Temp: 70º F
```

This setpoint is used to initiate both Morning Warm-up and Cool-down. When the VCB-X is configured for Morning Warm-up or Morning Cool-down 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 or Cool-down Mode. If the Return Air Temperature is below the Morning Warm-up Target Temperature by 1°F 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. If the Return Air Temperature is above the Morning Warm-up Target Temperature by 1°F and the Max Length is greater than "0," the VCB-X controller will initiate Cooling. This is considered Morning Cool-down and will run until the Return Air Temperature falls below the Morning Warm-up Target Temperature or until the Max Length Setpoint time expires.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Morning Warm Up Max Length | 0 Min | 60 Min | 240 Min |
| Morning Warm Up Target Temp | 50ºF (10ºC) | 70ºF (21ºC) | 90ºF (32.2ºC) |

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

```
VCBX Spts ID 101
Space Sensor Cal
Current:   0.0ºF
Offset.:   0.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Space Sensor Calibration Offset | -100.0ºF (-55.5ºC) | 0.0ºF (0ºC) | 100.0ºF (55.5ºC) |

## Setpoint Screen #47 - Return Air Temperature Sensor Calibration - Current and Offset

```
VCBX Spts ID 101
Return Sensor Cal
Current:   0.0ºF
Offset.:   0.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Return Air Sensor Calibration Offset | -100.0ºF (-55.5ºC) | 0.0ºF (0ºC) | 100.0ºF (55.5ºC) |

# VCB-X Setpoint Screens

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

```
VCBX Spts ID 101
 SAT Sensor Cal
Current:   0.0ºF
Offset.:   0.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Sensor Calibration SAT | -100.0ºF (-55.5ºC) | 0.0ºF (0ºC) | 100.0ºF (55.5ºC) |

## Setpoint Screen #49 - Coil Sensor Calibration - Current and Offset

```
VCBX Spts ID 101
 Coil Sensor Cal
Current:   0.0ºF
Offset.:   0.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Coil Sensor Calibration Offset | -100.0ºF (-55.5ºC) | 0.0ºF (0ºC) | 100.0ºF (55.5ºC) |

## Setpoint Screen #50 - OAT Sensor Calibration - Current and Offset

```
VCBX Spts ID 101
 OAT Sensor Cal
Current:   0.0ºF
Offset.:   0.0ºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| OAT Sensor Calibration Offset | -100.0ºF (-55.5ºC) | 0.0ºF (0ºC) | 100.0ºF (55.5ºC) |

## Setpoint Screen #51 - $CO_2$ Sensor Calibration - Current and Offset

```
VCBX Spts ID 101
 Co2 Sensor Cal
Current:   0ppm
Offset.:   0ppm
```

If the $CO_2$ 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 $CO_2$ Sensor reading. Enter a positive Sensor Calibration value in Line 4 to increase the $CO_2$ Sensor reading or a negative value in Line 4 to lower the Sensor reading.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Sensor Calibration $CO_2$ | -500.0 PPM | 0.0 PPM | 500.0 PPM |

## Setpoint Screen #52 - Leaving Water Temperature Sensor Calibration - Current and Offset

```
VCBX Spts ID 101
 Leaving H2O Cal
Current:   0.0ºF
Offset.:   0.0ºF
```

If the Leaving Water Temperature 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 Leaving Water Temperature Sensor reading. Enter a positive Sensor Calibration value in Line 4 to increase the Sensor's reading or a negative value in Line 4 to lower the Sensor reading.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Leaving H2O Temperature Sensor Calibration Offset | -100.0ºF (-55.5ºC) | 0.0ºF (0ºC) | 100.0ºF (55.5ºC) |

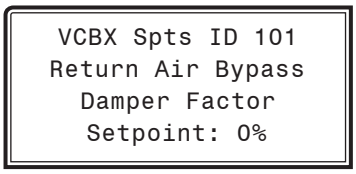
## Setpoint Screen #53 - SZ VAV Integral Constant

```
VCBX Spts ID 101
SZ VAV Integral
  Constant: 0
```

If the SZ VAV Fan Speed Control requires Integral control, enter the Integral constant here.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| SZ VAV Integral Constant | 0 | 0 | 10 |

## Setpoint Screen #54 - Return Air Bypass Damper Factor Setpoint

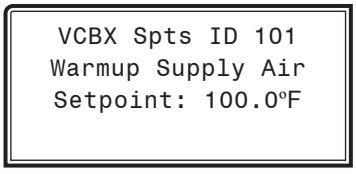



This setpoint is used when your HVAC unit is configured for Return Air Bypass Damper control. The Return Air Bypass Damper Factor Setpoint is a percentage value that is used to calculate the Return Air Damper position in relation to the Return Air Bypass Damper position. This provides a method for adjusting the airflow through the Return Air Bypass Damper.

Increasing this percentage increases the airflow through the Return Air Bypass Damper by causing the Return Air Damper to move further towards its closed position in relation to the Return Air Bypass Damper moving towards its open position.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Damper Factor | 0% | 0% | 100% |

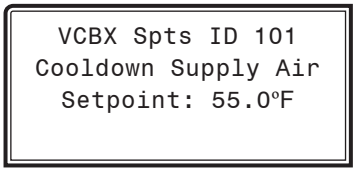
## Setpoint Screen #55 - Warm-Up Supply Air Temperature Setpoint




Heating will be controlled to this Supply Air Setpoint during Morning Warm Up and during Night Setback Heating in a Supply Air Tempering application.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Warm-Up SAT Setpoint | 40 | 100 | 240 |

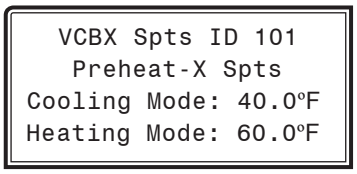
## Setpoint Screen #56 - Cool-Down Supply Air Temperature Setpoint




Cooling will be controlled to this Supply Air Setpoint during Morning Cool-Down and during Night Setback Cooling in a Supply Air Tempering application.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Cool-Down SAT Setpoint | 30 | 55 | 80 |

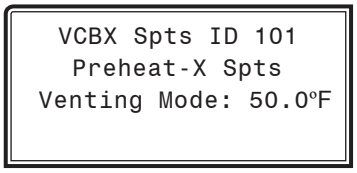
## Setpoint Screen #57 - PREHEAT-X Cooling Mode and Heating Mode Setpoints




If using the Preheat-X Controller with the VCB-X, this screen allows you to set the Preheat setpoint you want to control to during the Cooling and the Heating Modes.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Preheat-X Cooling Mode Setpoint | 35.0ºF (1.66ºC) | 40.0ºF (4.5ºC) | 90.0ºF (32.2ºC) |
| Preheat-X Heating Mode Setpoint | 35.0ºF (1.66ºC) | 60.0ºF (15.5ºC) | 90.0ºF (32.2ºC) |

## Setpoint Screen #58 - PREHEAT-X Venting Mode Setpoint




If using the Preheat-X Controller with the VCB-X, this screen allows you to set the Preheat setpoint you want to control to during the Vent Mode.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Preheat-X Venting Mode Setpoint | 35.0ºF (1.66ºC) | 50.0ºF (10.0ºC) | 90.0ºF (32.2ºC) |

# VCB-X Status Screens

## Status Screens - General Procedures

From any menu screen, *press* **<STATUS>**. The *Unit Selection Screen,* shown below, will appear requesting that you enter the unit ID number.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

*Enter* the correct unit ID number of the Controller you want to view and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**. You will then see Setpoint Screen #1. *Press* **<ENTER>** to save entered data and *press* **<⇩>** to scroll through the screens.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

## Status Screen Index

The available Status Screens for the VCB-X Controller are listed on the next few pages by sequential screen number. The following is a list of all the VCB-X Status Screens in numerical order with a brief listing of the Status features available on each screen:

| | |
|---|---|
| Screen #1 | Date & Time |
| Screen #2 | Application Type, Schedule Mode & HVAC Mode |
| Screen #3 | Controlling Temperature, Cooling & Heating Setpoints |
| Screen #4 | Space & Return Air Temperature & Slide Adjust |
| Screen #5 | Supply Air Temperature & Active Setpoint |
| Screen #6 | Cooling Enabled Yes/No |
| Screen #7 | Cooling Outputs - Active Stages & Mod Cooling Position |
| Screen #8 | Compressor Discharge Temperature |
| Screen #9 | Heating Enabled Yes/No or HP Heat Enabled, HP Aux Enabled & HP Emergency Heat Enabled |
| Screen #10 | Heating Outputs - Active Stages & Mod Heat Position |
| Screen #11 | MODGAS-X Enabled or Disabled and / MODGAS-X Heating Output Signal |
| Screen #12 | Current Indoor RH & Indoor RH Setpoint |
| Screen #13 | Current Coil Temperature, Current Coil Setpoint, and Suction Pressure |
| Screen #14 | Active Reheat Stages |
| Screen #15 | MHGRV-X Enabled or Disabled and MHGRV-X Reheat Valve Output Signal Percentage |
| Screen #16 | Preheat-X Enabled and Leaving Air Temperature Setpoint |
| Screen #17 | Current Preheat-X Leaving Air Temperature and Entering Air Temperature |
| Screen #18 | Current Preheat-X Modulating Position and Active Stages |
| Screen #19 | Current Outdoor Air Drybulb and Current Outdoor Air Relative Humidity |
| Screen #20 | Current Wetbulb Temperature and Current Calculated Outdoor Air Dewpoint Temperature |
| Screen #21 | Economizer Enabled or Disabled and Current Economizer Open Percentage |
| Screen #22 | Economizer Feedback Percentage for Title 24 Economizer |
| Screen #23 | Economizer in IAQ Mode Yes/No and Economizer Minimum Percentage |
| Screen #24 | Current $CO_2$ Level, Minimum Setpoint, and Maximum Setpoint |
| Screen #25 | Outdoor Air CFM and Supply Air CFM |
| Screen #26 | Return Air CFM and Exhaust Air CFM |
| Screen #27 | Current Duct Static Pressure, Current Duct Static Pressure Setpoint and Output Percentage |
| Screen #28 | Current Building Pressure and Setpoint |
| Screen #29 | Building Pressure Exhaust Fan Status and Output Signal Percentage |
| Screen #30 | Current Head Pressure 1 Reading, Head Pressure Setpoint, and Condenser 1 Signal |
| Screen #31 | Current Head Pressure 2 Reading, and Condenser 2 Signal |
| Screen #32 | Leaving Water Temperature, Entering Water Temperature & Current Suction Pressure |
| Screen #33 | WSHP Glycol Percentage and Heating & Cooling Modes Low Suction Setpoints |
| Screen #34 | WSHP Glycol Percentage, Unsafe Suction Setpoint, and Low Leaving Water Temperature |
| Screen #35 | Return Air Damper Signal & Return Air Bypass Damper Signal |
| Screen #36 | Reset Voltage Signal |
| Screens #37-42 | VCB-X Relays |
| Screens #43-47 | VCB-X EM1 Relays |
| Screens #48-59 | 12 Relay Expansion Module Relays |
| Screens #60-90 | Alarm Status Screens |

## Status

The VCB-X Controller Status Screens are accessed by *pressing* the **<STATUS>** button on the Modular Service Tool or Modular System Manager. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**. You will then see Setpoint Screen #1. *Press* **<ENTER>** to save entered data and *press* **<⇩>** to scroll through the screens.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

### Status Screen 1 - Date and Time

```
VCB-X   v2.00 ID 101
Controller Date/Time

 06/19/11 05:00 PM
```

**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

```
VCB-X   v2.00 ID 101
     App Type
  Schedule Mode
    HVAC Mode
```

**Line 2** **App Type:**

| | |
|---|---|
| Constant Volume | Single Zone VAV |
| VAV | VAV w/Tempering |
| Make Up Air | Space w/High OA% |

**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 | Cool Down |
| Remote Cool | Remote Heat |
| Remote Vent RH | Remote Cool RH |
| Remote Heat RH | |

### 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.

# VCB-X Status Screens

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

```
VCB-X   v2.00 ID 101
Supply Temp:  XXX.XX
Active Spt.:  XXX.XX
```

**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°.

**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

```
VCB-X   v2.00 ID 101
  Cooling Enabled
      YES/NO
```

**Line 3 Cooling Enabled YES/NO**

This line will display YES if Cooling is enabled and NO if the Cooling is not enabled. Cooling is enabled if the Outdoor Air Temperature is above the Compressor Cooling Lockout.

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

```
VCB-X   v2.00 ID 101
  Cooling Outputs
Active Stages:  XX
Mod Cool Pos.:  XXX%
```

**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 or a Chilled Water Valve.

## Status Screen 8 - Compressor Discharge Temperature

```
VCB-X   v2.00 ID 101
Compressor Discharge
    Temp: XXX.XX
```

**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

```
VCB-X   v2.00 ID 101
  Heating Enabled
      YES/NO
```

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.

```
VCB-X   v2.00 ID 101
HP Heat Enabled: YES
HP Aux Enabled:  YES
HP Emg Enabled:   NO
```

If this is a Heat Pump unit, the screen will appear as shown above.

**Line 2 HP Heat Enabled**

This line refers to Compressor Heating and will display YES if the Outdoor Air Temperature is above the Compressor Heating Lockout and below the Heating Lockout. Otherwise, it will display NO.

**Line 3 HP Aux Enabled**

This line refers to Heat Pump Auxiliary Heat and will display YES if the Outdoor Air Temperature is below Heating Lockout. Otherwise, it will display NO.

**Line 4 HP Emg Enabled**

This line refers to Heat Pump Emergency Heat and will display YES if the Outdoor Air Temperature is below the Compressor Heating Lockout. Otherwise, it will display NO.

## 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 by 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 (Saturation) 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 (Saturation) Temperature**

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

**Line 3** **Coil (Saturation) 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.

## 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 by the MHGRV-X Controller when you have one connected to the VCB-X Controller.

# VCB-X Status Screens

## Status Screen 16 - PREHEAT-X Controller Status and Leaving Air Temperature Setpoint

```
VCB-X   v2.00 ID 101
     Preheat-X
 Enabled:  YES/NO
Leaving Air: XX.XX
```

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

**Line 4** **Leaving Air Temperature Setpoint**
This is the configured Leaving Air Temperature Setpoint.

## Status Screen 17 - PREHEAT-X Controller Current Leaving Air and Entering Air Temperature

```
VCB-X   v2.00 ID 101
  Preheat-X Temps
Leaving Air: XX.XX
Entring Air: XX.XX
```

**Line 3** **Current PREHEAT-X Leaving Air Temperature**
If a Leaving Air Temperature Sensor(s) has been installed and configured on the PREHEAT-X, this screen will display the current Pre-Heat Leaving Air Temperature. If these conditions do not exist, it will display 0°F.

**Line 4** **Current PREHEAT-X Entering Air Temperature**
If an Entering Air Temperature Sensor has been installed and configured on the PREHEAT-X, this screen will display the current Pre-Heat Entering Air Temperature. If these conditions do not exist, it will display 0°F.

## Status Screen 18 - PREHEAT-X Controller Modulating Position and Active Stages

```
VCB-X   v2.00 ID 101
  Preheat-X Status
Mod Pos......: XXX%
Active Stages:    X
```

**Line 3** **Current PREHEAT-X Modulating Position**
If you do have a PREHEAT-X Controller connected to the VCB-X Controller and are using Modulating Heat, this is the current modulating heat signal.

**Line 4** **Current PREHEAT-X Active Stages**
If you have a PREHEAT-X Controller connected to the VCB-X Controller and are using staged heat, this is the number of stages currently active.

## Status Screen 19 - 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 20 - 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 not, 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 21 - 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 percentage signal currently being sent to the Economizer (Outdoor Air Damper), 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 22 - Title 24 Economizer Feedback

```
VCB-X   v2.00 ID 101
     Economizer
    Feedback: XXX%
[ Only For Title 24 ]
```

**Line 3 Title 24 Economizer Open Percentage**

If configured for Title 24 Economizer operation, this shows the Outdoor Air Damper Feedback Signal percentage. If Title 24 Economizer Control is not configured, it will display 0%.

## Status Screen 23 - 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 $CO_2$ 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 24 - $CO_2$ Level and Setpoints

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

**Line 2 Current $CO_2$ Level**

Indicates the $CO_2$ Level. You must install and configure a $CO_2$ Sensor to display the $CO_2$ Level. If a $CO_2$ Sensor is not installed and configured, this line will display 0 PPM.

**Line 3 Minimum $CO_2$ Setpoint**

This is the Minimum $CO_2$ Setpoint that was configured in *Setpoint Screen #33*.

**Line 4 Maximum $CO_2$ Setpoint**

This is the Maximum $CO_2$ Setpoint that was configured in *Setpoint Screen #33*.

## Status Screen 25 - 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 26 - 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

# VCB-X Status Screens

## Status Screen 27 - 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 #15.

**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 Confg].

## Status Screen 28 - 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 #35.

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

## Status Screen 29 - 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 Confg].

## Status Screen 30 - Head Pressure 1 Setpoint and Condenser Fan 1 Signal

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

**Line 2** **Head Pressure 1**

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 1 Signal**

This indicates the current percentage signal being sent to the first Condenser Fan or Valve in order to maintain the Head Pressure Setpoint.

## Status Screen 31 - Head Pressure 2 Setpoint and Condenser Fan 2 Signal

```
VCB-X   v2.00 ID 101
 Head Pr 2: XXX PSI

  Cond Sig 2: XXX%
```

**Line 2** **Head Pressure 2**

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

**Line 3** **Blank**

**Line 4** **Condenser 2 Signal**

This indicates the current percentage signal being sent to the second Condenser Fan or Valve in order to maintain the Head Pressure Setpoint.

## Status Screen 32 - Leaving Water Temperature, Entering Water Temperature & Suction Pressure

```
VCB-X  v2.00 ID 101
Lvg 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 Suction Pressure**
This is the current Suction Pressure.

## Status Screen 33 - Water Source Heat Pump Module Setpoints - Heating and Cooling

```
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 34 - 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.

## Status Screen 35 - Return Air Damper Signal & Return Air Bypass Damper Signal

```
VCB-X  v2.00 ID 101
Return Dmp..:   XXX%
Bypass Dmp..:   XXX%
 [Optional Outputs]
```

**Line 2 Current Return Air Damper Signal**
If configured for Return Air Bypass Control, this indicates the current Output Signal percentage being sent to the Return Air Damper Actuator. If you haven't configured a Return Air Bypass Damper, [No Return Dmp Confg] will be displayed instead.

**Line 3 Current Return Air Bypass Damper Signal**
Indicates the current Output Signal percentage being sent to the Return Air Bypass Damper Actuator. If you haven't configured a Return Air Bypass Damper, [No Bypass Dmp Confg] will be displayed instead.

**Line 4 Indicates That These Are Optional Outputs**
This output may or may not have live data to display.

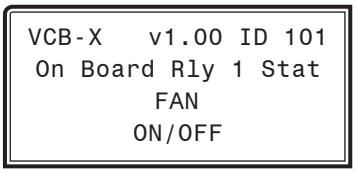
## Status Screen 36 - Reset Voltage Signal

```
VCB-X  v2.00 ID 101
Reset Voltage Signal
       0.0VDC
```

**Line 2-3 Reset Voltage Signal**
If using a Remote Voltage Signal to reset the Supply Air Temperature setpoint and you have an EM2 Expansion Module installed and configured, this screen will display the current Reset Voltage Signal being sent to the controller.

# VCB-X Status Screens

## Status Screens 37-42 - VCB-X Relays




**Line 2** **On Board Relays 1-6 Status**

**Line 3** **Current description of what this Relay is configured for**

On screen 37, this line will display FAN.
On screens 38-42, this line will indicate the relay's use.
Possible options are:

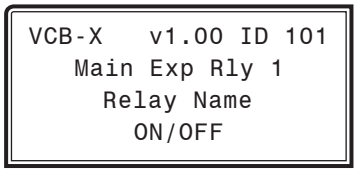
| | |
|---|---|
| Not Used (Default) | Digital Compressor |
| Cooling Stage | Heating Stage |
| Condenser #1 | Condenser #2 |
| HP Water Valve | HP Compressor |
| HP Reversing Valve | HP Aux Heat |
| HP Emergency Heat | Mod Heat Enable |
| Mod Cool Enable | Warmup / Cooldown |
| Reheat | Preheat |
| Low Ambient | Exhaust Fan |
| Economizer | Heat Wheel |
| Occupied Mode | Override Mode |
| Alarm Active | |

**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 43-47 - EM1 Relays




**Line 2** **On Board Relays 1-5 Status**

**Line 3** **Current description of what this Relay is configured for**

On screens 43-47, this line will indicate the relay's use.
Possible options are:

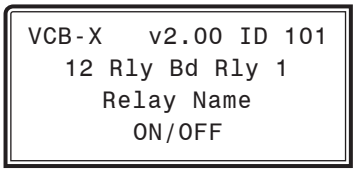
| | |
|---|---|
| Not Used (Default) | Digital Compressor |
| Cooling Stage | Heating Stage |
| Condenser #1 | Condenser #2 |
| HP Water Valve | HP Compressor |
| HP Reversing Valve | HP Aux Heat |
| HP Emergency Heat | Mod Heat Enable |
| Mod Cool Enable | Warmup / Cooldown |
| Reheat | Preheat |
| Low Ambient | Exhaust Fan |
| Economizer | Heat Wheel |
| Occupied Mode | Override Mode |
| Alarm Active | |

**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 48-59 - 12 Relay Expansion Module Relays




**Line 2** **On Board Relays 1-12 Status**

**Line 3** **Current description of what this Relay is configured for**
On screens 48-59, this line will indicate the relay's use. Possible options are:

| | |
|---|---|
| Not Used (Default) | Digital Compressor |
| Cooling Stage | Heating Stage |
| Condenser #1 | Condenser #2 |
| HP Water Valve | HP Compressor |
| HP Reversing Valve | HP Aux Heat |
| HP Emergency Heat | Mod Heat Enable |
| Mod Cool Enable | Warmup / Cooldown |
| Reheat | Preheat |
| Low Ambient | Exhaust Fan |
| Economizer | Heat Wheel |
| Occupied Mode | Override Mode |
| Alarm Active | |

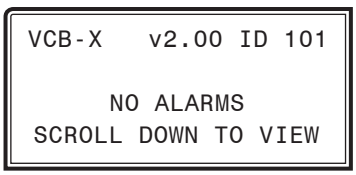
**Line 4** **Current Relay Status**
This line will display the ON/OFF condition for that relay. FORCED ON or FORCED OFF will appear if this Relay is in a Force Mode. Possible options are as follows:

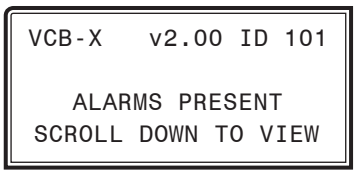
| | |
|---|---|
| ON | OFF |
| FORCED ON | FORCED OFF |

## Status Screens 60 - 90 - Alarm Status

*Press* **<ALARMS>**. The *Unit Selection Screen* will be displayed. Enter the Unit ID of the controller you wish to search and *press* **<ENTER>.** You must type in the number, even if it is "1". Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>.**

The System Manager or Service Tool will search for any active alarms on the unit and one of the following screens will appear:




**Line 2** **Blank**

**Line 3** **NO ALARMS OR ALARMS PRESENT**

**If alarms are present, the screens that follow will display one or more of the following:**

Bad SAT Sensor
Bad RAT Sensor
Bad OAT Sensor
Bad Space Sensor
Missing EM1
Bad Coil Sensor
Bad $CO_2$ Sensor
Bad Compressor Discharge Sensor
Missing Outdoor Airflow Sensor
Missing Exhaust Airflow Sensor
Missing Supply Air Airflow Sensor
Missing Return Air Airflow Sensor
Missing MHGRV-X
Missing MODGAS-X
Missing 12RLY
Missing EM2
Mech Cooling Failure
Mech Heating Failure
Fan Proving Alarm
Dirty Filter Alarm
Emergency Shutdown
High Supply Air Temperature Cutoff
Low Supply Air Temperature Cutoff
High Control Temp
Low Control Temp
Digital Compressor Cutoff
Digital Compressor Lockout
High Head Pressure 1
WSHP Proof of Flow Failure
Low Suction Pressure
High Suction Pressure
WSHP Low Water Temperature
High Head Pressure 2
Preheat Alarm
Missing Head Pressure 1
Missing Head Pressure 2
Title 24 Economizer Air Temp Sensor Fail
Title 24 Economizer Damper Fail
Title 24 Economizer Not Economizing When It Should
Title 24 Economizer Economizing But Shouldn't
Title 24 Economizer Excess Outdoor Air

*Press* **<⇩>** to scroll through all active alarms.

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

# 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.

### Modular Service Tool Instructions

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

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

*Enter* the correct unit ID number of the VAV/Zone controller you want to configure, and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**. You will then see *Unit Configuration Screen #1*. *Press* **<ENTER>** to save entered data and *press* **<⇩>** to scroll through the screens.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

### System Manager SD Instructions

From any Main screen, *press* **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Change Setpoints
Configure Unit
Save/Copy/Restore
```

Scroll down to the 'Configure Unit' option and *press* **<ENTER>**. This will take you to the first Configuration Screen shown below.

### Configuration Screen #1 - Box Configuration

```
XX Box Cnfg  IDXXXX
 Box Configuration
 COOLING ONLY BOX
Use < Or > To Change
```

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
Use < Or > To Change
```

*Select* Direct Acting or 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
Use < Or > To Change
```

If this is a Zoned System, *select* YES 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.

### Configuration Screen #5 - Expansion Relays Heating Stages

```
XX Box Cnfg  IDXXXX
  Expansion Relays
     [Optional]
Steps of Reheat.:   2
```

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.

### Configuration Screen #6 - Proportional Heating Signal

```
XX Box Cnfg  IDXXXX
Proportional Heating
Signal..: 0 - 10 VDC
Use < Or > To Change
```

*Select* 0-10 VDC or 2-10 VDC as the range of the proportional heat output.

### Configuration Screen #7 - Box Heat Allow

```
XX Box Cnfg  IDXXXX
Allow Box Heat With
 HVAC Heat....:  NO
Use < Or > To Change
```

*Select* 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.

### Configuration Screen #8 - Main Fan Status

```
XX Box Cnfg  IDXXXX
This Unit Needs Main
 Fan Status...:  NO
Use < Or > To Change
```

This setting only applies to the unoccupied mode of operation. *Select* 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 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 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.

### Configuration Screen #9 - Push-Button Override

```
XX Box Cnfg  IDXXXX
Push-Button Override
   Group ID #: 1
```

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.

If you don't want a specific zone to be a part of any group, *enter* **<0>** for its Group ID #.

# VAV/Zone Configuration Screens

## Configuration Screen #10 - Dump Zone

```
XX Box Cnfg  IDXXXX
Is This A Dump Zone
(No Actuator):  NO
Use < Or > To Change
```

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* YES; otherwise, be sure it is set to NO.

## Configuration Screen #11 - HVAC Unit is on Separate Loop

```
XX Box Cnfg  IDXXXX
  HVAC Unit is on
 Separate Loop:  NO
Use < Or > To Change
```

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* YES; otherwise, be sure it is set to NO.

## VAV/Zone Controller Setpoints

### Modular Service Tool Instructions

From any menu screen, *press* **<SETPOINTS>**. The *Unit Selection Screen,* shown below, will appear requesting that you enter the unit ID number.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

*Enter* the correct unit ID number of the Controller you want to change Setpoints for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**. You will then see Setpoint Screen #1. *Press* **<ENTER>** to save entered data and *press* **<⇩>** to scroll through the screens.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

### System Manager SD Instructions

From any Main screen, *press* **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Change Setpoints
Configure Unit
Save/Copy/Restore
```

Scroll to the 'Change Setpoints' option and *press* **<ENTER>**. This will take you to the first Setpoints Screen shown below.

## Setpoint Screen #1 - Occupied Setpoints

```
 XX Box Spts IDXXXX
 Occupied Setpoints
Cooling.....:   XXºF
Heating.....:   XXºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Cooling Setpoint | 50ºF | 74ºF | 90ºF |
| Heating Setpoint | 50ºF | 70ºF | 90ºF |

## Setpoint Screen #2 - Unoccupied Setbacks

```
 XX Box Spts IDXXXX
 Unoccupied Setbacks
Cooling SetUp:  XXºF
Heating SetBk:  XXºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Cooling SetUp | 0ºF | +10ºF | +30ºF |
| Heating SetBk | 0ºF | -10ºF | -30ºF |

# VAV/Zone Setpoint Screens

## Setpoint Screen #3 - AHU Heat Call Space Temp

```
XX Box Spts IDXXXX
   AHU Heat Call
Space Temp...:  XXºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| AHU Heat Call Space Temp | 50ºF | 70ºF | 90ºF |

## Setpoint Screen #4 - Auxiliary Heat Setpoint

```
XX Box Spts IDXXXX
  Auxiliary Heat
 Setpoint..:  XXºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Auxiliary Heat Setpoint | 50ºF | 70ºF | 90ºF |

## Setpoint Screen #5 - Damper Airflow Integral

```
XX Box Spts IDXXXX
 Damper/Airflow Spt
Integral [Ki]..:  XXX
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Integral | 0 | 0 | 100 |

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

```
XX Box Spts IDXXXX
 Damper/Airflow Spt
Maximum..:      XXX %
Vent Min.:      XXX %
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Maximum | 0% or 0 CFM | 100% or 1000 CFM | 100% or 30000 CFM |
| Vent Min | 0% or 0 CFM | 25% or 250 CFM | 100% or 30000 CFM |

## Setpoint Screen #7 - Damper Airflow Cool/ Heat Minimum

```
XX Box Spts IDXXXX
 Damper/Airflow Spt
Cool Min.:      XXX %
Heat Min.:      XXX %
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Cool Min | 0% or 0 CFM | 10% or 1000 CFM | 100% or 30000 CFM |
| Heat Min | 0% or 0 CFM | 10% or 100 CFM | 100% or 30000 CFM |

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

```
  XX Box Spts IDXXXX
  Damper/Airflow Spt
Night Min.:     XXX %
Fan On Min.:    XXX %
```

The Night Min position is the position the damper will move to when the system is in Pushbutton Override Mode and this particular damper is not part of that Override Group. When not in Pushbutton Override, pressure independent boxes will only go to the Night Min CFM setpoint position if it is set to 0. Pressure dependent boxes will always stay at the Night Min position. 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 = %.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Night Min | 0% or 0 CFM | 0% or 0 CFM | 100% or 9999 CFM |
| Fan On Min | 0% or 0 CFM | 25% or 250 CFM | 100% or 9999 CFM |

## Setpoint Screen #9 - Damper Airflow Reheat Min

```
  XX Box Spts IDXXXX
  Damper/Airflow Spt
Reheat Min.:    XXX %
```

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

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Reheat Min | 0% or 0 CFM | 0% or 0 CFM | 100% or 30000 CFM |

## Setpoint Screen #10 - Damper Airflow Fixed Position

```
  XX Box Spts IDXXXX
  Damper/Airflow Spt
Fixed Pos:      XXX %
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Fixed Pos | 0% or 0 CFM | 0% or 0 CFM | 100% or 9999 CFM |

## Setpoint Screen #11 - SAT HVAC Mode Deadband

```
  XX Box Spts IDXXXX
    SAT HVAC Mode
 Deadband.:    XXºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| SAT HVAC Mode Deadband | 0ºF | 10ºF | 20ºF |

## Setpoint Screen #12 - Zone Alarm Offsets

```
  XX Box Spts IDXXXX
  Zone Alarm Offsets
Hi Zone......:   XXºF
Lo Zone......:   XXºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Hi Zone Alarm | +1ºF | +30ºF | +50ºF |
| Lo Zone Alarm | -1ºF | -30ºF | -50ºF |

# VAV/Zone Setpoint Screens

## Setpoint Screen #13 - Zone Alarm Delay

```
XX Box Spts IDXXXX
 Zone Alarm Delay
  Must Be Out Of
Limits For.: XXX Min
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Out of Limits | 1 Min | 30 Min | 300 Min |

## Setpoint Screen #14 - Day/Night Schedule

```
XX Box Spts IDXXXX
Day/Night Schedule
   Control #: X
O=AHU  1-5=Scheduler
```

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 VCB-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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Schedule Control Number | 0 | 0 | 1 to 5 |

## Setpoint Screen #15 - Maximum Slide Offset

```
 XX Box Spts IDXXXX
Maximum Slide Offset
Effect on Spt.:  XºF
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Effect on SP | 0ºF | 0ºF | 6ºF |

## Setpoint Screen #16 - Push-Button Override Duration

```
 XX Box Spts IDXXXX
Push-Button Override
Duration    : X.X Hr
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Duration | 0.0 Hr | 0.0 Hr | 8.0 Hr |

## Setpoint Screen #17 - Maximum EMS Offset

```
 XX Box Spts IDXXXX
Maximum EMS Setpoint
   Offset...:  XXºF
```

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

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| Maximum EMS Setpoint Offset | 0ºF | 0ºF | 30ºF |

## Setpoint Screen #18 - Sensor Calibration for Space Temp and Supply Air Temp

```
 Sensor Calibration
SPC:  XXX.Xº   XXX.Xº
SAT:  XXX.Xº   XXX.Xº
[SAT Only if Sensor]
```

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.

| Description | Minimum | Default | Maximum |
|---|---|---|---|
| SPC (Space Temp) | -100ºF | 0ºF | +100ºF |
| SAT (Supply Air) | -100ºF | 0ºF | +100ºF |

## VAV/Zone Status

### Status Screen #1 - Mode of Operation

```
XX Box v4.01 IDXXXX
   Occupied Mode
     Vent Mode
Belongs to Group # 1
```

**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

```
 XX Box v4.01 IDXXXX
Zone Temp..:  XX.XºF
Cooling Spt:  XX.XºF
Heating Spt:  XX.XºF
```

**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

```
 XX Box v4.01 IDXXXX
Slide Offset:   XXºF
H/C Demand.:  XX.XºF
```

**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

```
 XX Box v4.01 IDXXXX
Supply Air:    XX.XºF
Box Air..:     XX.XºF
```

**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 VCB-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**

# VAV/Zone Status Screens

## 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!
```

```
XX Box v.104 IDXXXX

   ALARMS PRESENT
SCROLL DOWN TO VIEW
```

**Line 2** Blank

**Line 3** NO ALARMS! OR ALARMS PRESENT

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

*Press* **<⇩>** to scroll through all active alarms.

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

## Damper Force Modes

Damper Force Modes are available for testing or balancing the system. These Force Modes can be accessed and programmed from the Modular Service Tool.

### Modular Service Tool Instructions

When using the Modular Service Tool, simply *press* the **<BALANCE - TEST>** key. You will then see the *Unit ID Screen*. *Enter* the unit ID of the controller you wish to access and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Damper Force
Para Blocks
Load / Save / Copy
```

With the cursor on Damper Force, *press* **<ENTER>** to access the *Damper Force Mode Screen*.

### Dampers Force Mode Screen

If the unit ID you entered is for a VCB-X Controller that has VAV/Zone Controllers connected to its communication loop, the Damper Force Mode will act as a "Global" Damper Force Mode. That is, all VAV/Zone Controllers on that VCB-X Controller's communication loop will be forced to the same Damper Force Mode setting. If the unit ID you entered is for a VAV/Zone Controller, the Damper Force Mode setting will only apply to that VAV/Zone Controller.

```
     Damper Force
Enter Force Mode: 0
0=Auto 1=Open 2=Clsd
3=Max  4=Min  5=Fixed
```

Set the appropriate Damper Force Mode by entering numbers 0 through 5. Following is a list of the force modes and their meaning:

| | |
|---|---|
| 0 = Auto | This is the default setpoint. With this setting, the damper will operate normally and modulate according to the controller setpoints. |
| 1 = Open | This setting will force the dampers to their fully-open position. |
| 2 = Clsd | This setting will force the damper to its fully-closed position. |
| 3 = Max | This setting will force the damper to its Maximum Position Setpoint. See *VAV/Zone Controller Setpoint Screen #5* on **page 70** for complete setpoint information. |
| 4 = Min | This setting will force the damper to its Minimum Position Setpoint. See *VAV/Zone Controller Setpoint Screen #5* on **page 70** for complete setpoint information. |
| 5 = Fixed | This setting will force the damper to a fixed position based on the Fixed Position Setpoint. See *VAV/Zone Controller Setpoint Screen #8* on **page 71** for complete setpoint information. |

**CAUTION:** The Damper Force Modes should only be used by qualified service personnel. Serious damage to the ductwork could result if the dampers are all forced closed and the HVAC unit fan is operating.

# MiniLink PD Configuration Screens

## MiniLink PD Configuration

**NOTE:** If this is not a voting system, the only screens you need to configure are Screens 6 through 65 if alarm polling pertains 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* **<SETPOINTS>**. The *Unit Selection Screen,* shown below, will appear requesting that you enter the unit ID number.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

All MiniLink PDs are set at address 60. Enter the correct unit loop number for the loop the MiniLink Polling Device is connected to (for Loop 1 you would enter **<160>**) and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

You will then see Setpoint Screen #1. *Press* **<ENTER>** to save entered data and *press* **<⇩>** to scroll through the screens.

### System Manager SD Instructions

From any Main screen, *press* **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Change Setpoints
Configure Unit
Save/Copy/Restore
```

Scroll to the 'Change Setpoints' option and *press* **<ENTER>**. This will take you to the first Setpoints Screen shown below.

### Configuration Screen #1 - System Type

```
Polling Unit Config
   System  Type
 Selection:  ZONING
Use < Or > To Change
```

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

```
Polling Unit Config
 Last Polled Zone
   Address:  XX
[Enter Last Zone]
```

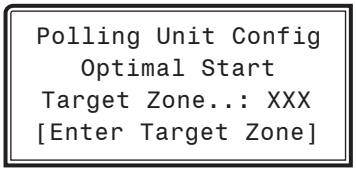
This zone is the last zone on the local loop of your zoning system that is to be included in zone voting.

### Configuration Screen #3 - Mode Changeover Time

```
Polling Unit Config
Mode Changeover Time
   Minutes:  XX
[Enter Period Time]
```

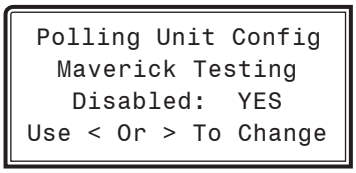
This is the amount of time that you want to allow between changeover from heating to cooling modes.

### Configuration Screen #4 - Optimal Start Target Zone



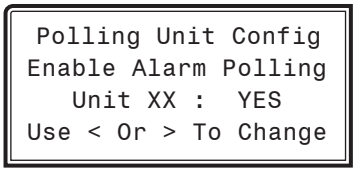

This is the unit ID of the Zone that you want to be satisfied by the normally scheduled start time. If you enter "-1" into this box, it will average all zones instead of picking a specific zone. If you do not require Optimal Start, enter "0".

### 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.

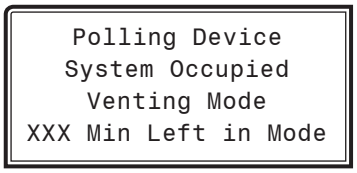
### Configuration Screens #6-65 - Alarm Polling




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

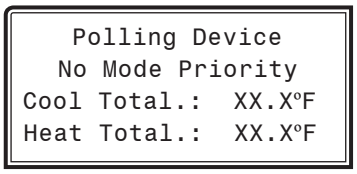



**Line 2** **Current Schedule Mode**
Can be System Occupied or System Unoccupied.

**Line 3** **Currently System Status**
Can be Vent Mode, Cooling Mode, or Heat Mode.

**Line 4** **Minutes Left In Mode**
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.

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




**Line 2** **Mode Priority**
Can be Heat Priority or Cool Priority. This is based on the voting zones and their demand.

**Line 3** **Cool Total**
Total cooling temperature demand from all zones.

**Line 4** **Heat Total**
Total heating temperature demand from all zones.

# VCB-X Outputs Force

## Outputs Force

Outputs Force settings are available for testing or troubleshooting the system. These Force settings can only 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 Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the unit ID of the VCB-X Controller you wish to access and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**. You will then see the screen shown below. *Press* **<ENTER>** to save entered data and *press* **<⇩>** to scroll through the screens.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

**NOTE:** 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.

```
Outputs Force
Para Blocks
Save / Load / Copy
```

Place the cursor on Outputs Force and *press* **<ENTER>** to access the *Outputs Force Screen*.

```
Supply Fan Override
Auto

Use < Or > To Change
```

The first *Outputs Force Screen* allows the AHU fan relay to be set for Auto, Force On, or Force Off. The default setting is Auto. After you complete all troubleshooting or testing procedures, all relays should be changed back to this setting. The Force On setting will force the relay to the ON (energized) position. The Force Off selection will force the relay to the OFF (de-energized) position.

The next screen displays the Relay Overrides for Relay 2. After *pressing* **<ENTER>** to save any changes, *press* **<⇩>** to have the next relay displayed. All 23 *Relay Override Screens* (including the AHU fan relay) are available by *pressing* **<⇩>** after each setting is saved by pressing **<ENTER>** .

```
  Relay Overrides
Relay 2 Override
Auto
Use < Or > To Change
```

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

**Analog Output 1 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 are valid entries. *Press* **<ENTER>** after making a setting change and then *press* **<⇩>** and the next *Analog Output Override Screen* will be displayed.

**Analog Output 2 Screen**

```
    Economizer
Override Volts: -1.0

    [-1.0=Auto]
```

The default setting for normal operation is -1.0 volts. Voltages between 0 to 10.0 are valid entries. *Press* **<ENTER>** after making a setting change and then *press* **<⇩>** and the next *Analog Output Override Screen* will be displayed.

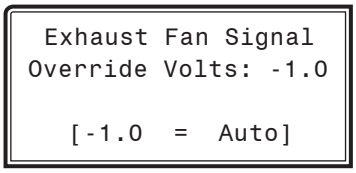
**Analog Output 3 Screen**

```
  Modulating Heat
Override %...: -10%

  [-10  =  Auto]
```

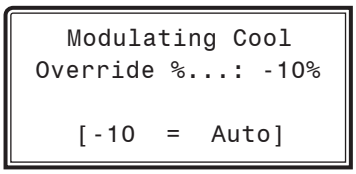
The default setting for normal operation is -10 %. Percentages between 0 to 100 are valid entries. *Press* **<ENTER>** after making a setting change and then *press* **<⇩>** and the next *Analog Output Override Screen* will be displayed.

**Analog Output 4 Screen**



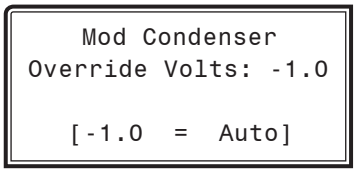

The default setting for normal operation is -1.0 volts. Voltages between 0 to 10.0 are valid entries. *Press* **<ENTER>** after making a setting change and then *press* **<⇩>** and the next *Analog Output Override Screen* will be displayed.

**Analog Output 5 Screen**




The default setting for normal operation is -10%. Percentages between 0 to 100 are valid entries. *Press* **<ENTER>** after making a setting change and then *press* **<⇩>** and the next *Analog Output Override Screen* will be displayed.

**Analog Output 6 Screen**




The default setting for normal operation is -1.0 volts. Voltages between 0 to 10.0 are valid entries. *Press* **<ENTER>** after making a setting change.

# Saving & Copying Setpoints

### Modular Service Tool Instructions

From any menu screen, *press* **<BALANCE-TEST>**. The *Unit Selection Screen* will appear requesting that you enter the unit ID number.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

*Enter* the network unit ID for the controller you want to save the setpoints from. Example, '102' for Loop 1 / Unit 2. Then *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." After a brief pause, *press* **<⇩>** to get to the *Balance - Test Screen* shown below.

```
Outputs Force
Para Blocks
Save/Copy/Restore
```

Scroll down to the 'Save/Copy/Restore' option and *press* **<ENTER>**. This will take you to the Save Setpoints screen.

### System Manager SD Instructions

From any Main screen, *press* **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

```
THIS ACTION REQUIRES
 PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address
 Then Press Enter
Selected Unit#: XXXX
 No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<⇩>**.

**NOTE:** If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Change Setpoints
Configure Unit
Save/Copy/Restore
```

Scroll down to the 'Save/Copy/Restore' option and *press* **<ENTER>**. This will take you to the Save Setpoints screen.

## Save Setpoints - Network Mode

From the *Save Setpoints Screen* shown below:

```
  Save Setpoints
Press Enter To Save
```

*Press* **<ENTER>** and a setpoint file will be saved to the SD card. You will receive a message that the save was successful. This file is specific to this controller on this loop.

## Copy Setpoints - Network Mode

To copy a saved setpoints file to other controllers on the network do the following:

From the *Save Setpoints Screen* shown below:

```
   Save Setpoints
Press Enter To Save
```

*Press* **<⇩>** once to access the *Copy Setpoints Screen* shown below.

```
    Copy Setpoints
From Loop  1
From Unit  2
Press Enter to Copy
```

In the 'From Loop' field, enter the Loop of the controller you want to copy the setpoints from. In this example it is '1'. Then *press* **<ENTER>**.

In the 'From Unit' field, enter the Unit ID of the controller you want to copy the setpoints from. In this example it is '2'. Then *press* **<ENTER>**.

Now your cursor will be on the last line, and you can *press* **<ENTER>** once more to copy the setpoint file from unit 102 to unit 103.

You will receive a confirmation that the copy was successful.

## Save & Copy Setpoints - Stand-Alone Mode

The instructions for Stand-Alone Mode are exactly the same as Network Mode, except that there is no need to enter a Loop number in the Unit ID number field and in the *Copy Setpoints Screen*, enter a zero in the 'From Loop' field.

## Restore Setpoints - Network or Stand-Alone Mode

The Restore Setpoints feature is used to reload a saved setpoints file from one controller back to itself. This could be useful if setpoints or configurations were changed and need to be reset.

You can perform this function on a networked system; however, the Modular Service Tool needs to be directly connected to the controller you wish to restore previously saved setpoints to.

From the *Save Setpoints Screen* shown below:

```
   Save Setpoints
Press Enter To Save
```

*Press* **<⇩>** four times to access the *Restore Setpoints Screen* shown below.

```
  Restore Setpoints
Press Enter to Load
```

*Press* **<ENTER>**. This will reload the setpoints from the saved file. You will receive confirmation that the setpoints were loaded successfully.

# SD Memory Card Update

## Updating Your SD Memory Card

You may need to update your SD memory card from time to time, either for a new release or to add data for another Controller.

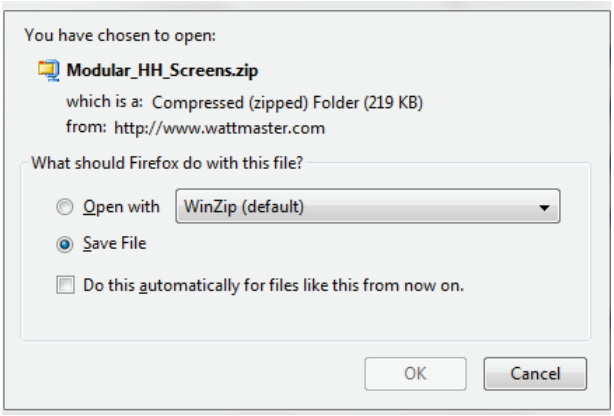
Follow the instructions below to download the update file from our tech support webpage:

1. Insert the SD memory card in your computer's SD drive and open the drive's window.

2. Open your browser and type in the address: http://wattmaster.com/techsupport.

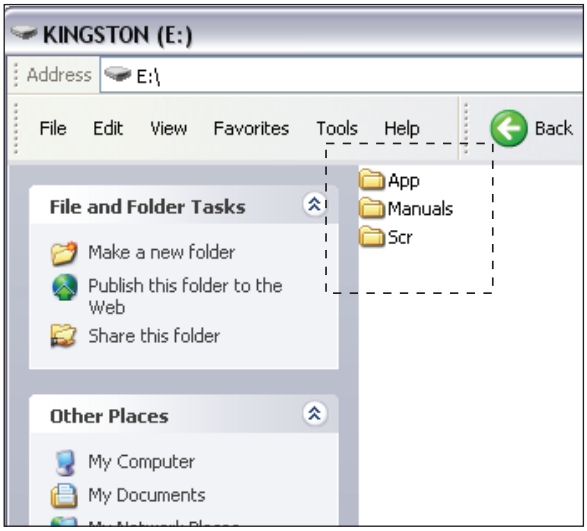
3. On the Tech Support webpage, locate the file Modular_HH_Screens.zip and *double-click* on it.

4. Click **<Save File>** when asked to save or open the file and then *click* **<OK>**. This option will save the file to the "Downloads" folder on your PC.




5. *Open* the "Downloads" folder in Windows Explorer. You will find a folder labeled, "Modular_HH_Screens.zip." *Right-click* on this folder and choose "Extract All" from the options list. **NOTE:** Any compression software can be used to extract the zip folder's contents, for example, Winzip.

6. Once you unzip the file, you will see a window similar to the one below.




7. *Press* **<CTRL> <A>** to highlight the folders in the window—App, Manuals & Scr. Press **<CTRL> <C>** to copy the folders.

8. Paste the files into the SD memory card drive's window by *pressing* **<CTRL> <V>**.

9. Remove the SD Memory Card from your computer and reinsert it in the Modular Hand Held Service Tool or Modular System Manager.

## Updating Controller & E-BUS Module Software Using the Modular Service Tool SD

To update the software for various WattMaster controllers and E-BUS modules, follow these simple steps.

1. Update your SD memory card with the new software file for the controller or module you need to update. Follow the steps on **page 82** for Updating the SD memory card.

2. Connect the Modular Service Tool to the device you wish to update using the mini DIN communication cable or EBC E-BUS cable provided.

3. Power up the controller or E-BUS module you wish to update.

4. Apply power to the Modular Service Tool SD and *press* the **<ON>** button.

5. After initialization of the Modular Service Tool SD, *press* **<NEXT>** *at the first Setup Screen and* **<4>** at the second *Setup Screen* shown below.

```
 1) Set Time & Date
 2) Communications
NEXT) More Options
ESC) Exit Menu
```

```
 3) Energy Saving
 4) Update Software
NEXT) More Options
ESC) Exit Menu
```

6. The *Update Software Screen* will appear as shown below:

```
Select Communication
1) WattMaster Comm
2) E-BUS Module
ESC) Exit Menu
```

7. Follow the instructions for WattMaster Controllers or E-BUS Modules.

### WattMaster Controllers

1. *Press* **<1>** to update a WattMaster Controller. The following screen will appear:

```
Enter Board Address
         0

Esc) Exit Menu
```

2. *Enter* the address of the controller you are updating and then *press* **<ENTER>**.

3. The *Software Version Screen* will appear as shown below. *Enter* **<0>** for the latest software version or enter the number of an older version given to you by Technical Support. Then *press* **<ENTER>**.

```
  Software Version
Enter 0 for Latest
         0
Esc) Exit Menu
```

4. The screen will display the following messages:
"Resetting Unit"
"Load Sys Info"

5. If communications are successful, the screen will display, the name of the HEX file on the top line, "Flash Memory Erased" on the second line, and the progress percentage on the third line.

   **NOTE:** If communications are not successful, the screen will display, "Press Any Key to Continue. Cannot Load Sys Info." Make sure you have the right address and the right software version on your SD card. If these two items are correct and you still experience a problem, contact Technical Support.

6. When updating is complete, the screen will display, "Finish Download."

# Updating Controller & E-BUS Module Software

### E-BUS Modules

1. *Press* **<2>** to update an E-BUS Module. The following screen will appear:

```
Enter Board Address
          0

Esc) Exit Menu
```

2. *Enter* the address of the E-BUS module you are updating and then *press* **<ENTER>**. The following is the list of Module addresses:

   WSHP-X - address 17
   MHGRV-X - address 132
   MODGAS-X - address 138

3 .The *Software Version Screen* will appear as shown below. *Enter* **<0>** for the latest software version or enter the number of an older version if given to you by Technical Support. Then *press* **<ENTER>**.

```
  Software Version
Enter 0 for Latest
          0
Esc) Exit Menu
```

4. The screen will display the following messages:
   "Resetting Unit"
   "Load Sys Info"

5. If communications are successful, the screen will display, the name of the HEX file on the top line, "Flash Memory Erased" on the second line, and the progress percentage on the third line.

   **NOTE:** If communications are not successful, the screen will display, "Press Any Key to Continue. Cannot Load Sys Info." Make sure you have the right address and the right software version on your SD card. If these two items are correct and you still experience a problem, contact Technical Support.

6. When updating is complete, the screen will display, "Finish Download."

## A



## B



## C



## D

## E



## F



## H



## I



## K



## L

## M



## N



## O

## P



## R



## S

## T



## U

## V



## W



## Y



## Z

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