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VCM-X - Operator Interfaces Technical Guide

VCM-X Controller Code: SS1026, SS1030, SS1032, SS1033, SS1034
 Requires System Manager Code: SS1028 Version 1.0 and up
 Requires Service Tool Code: SS1027 Version 1.0 and up

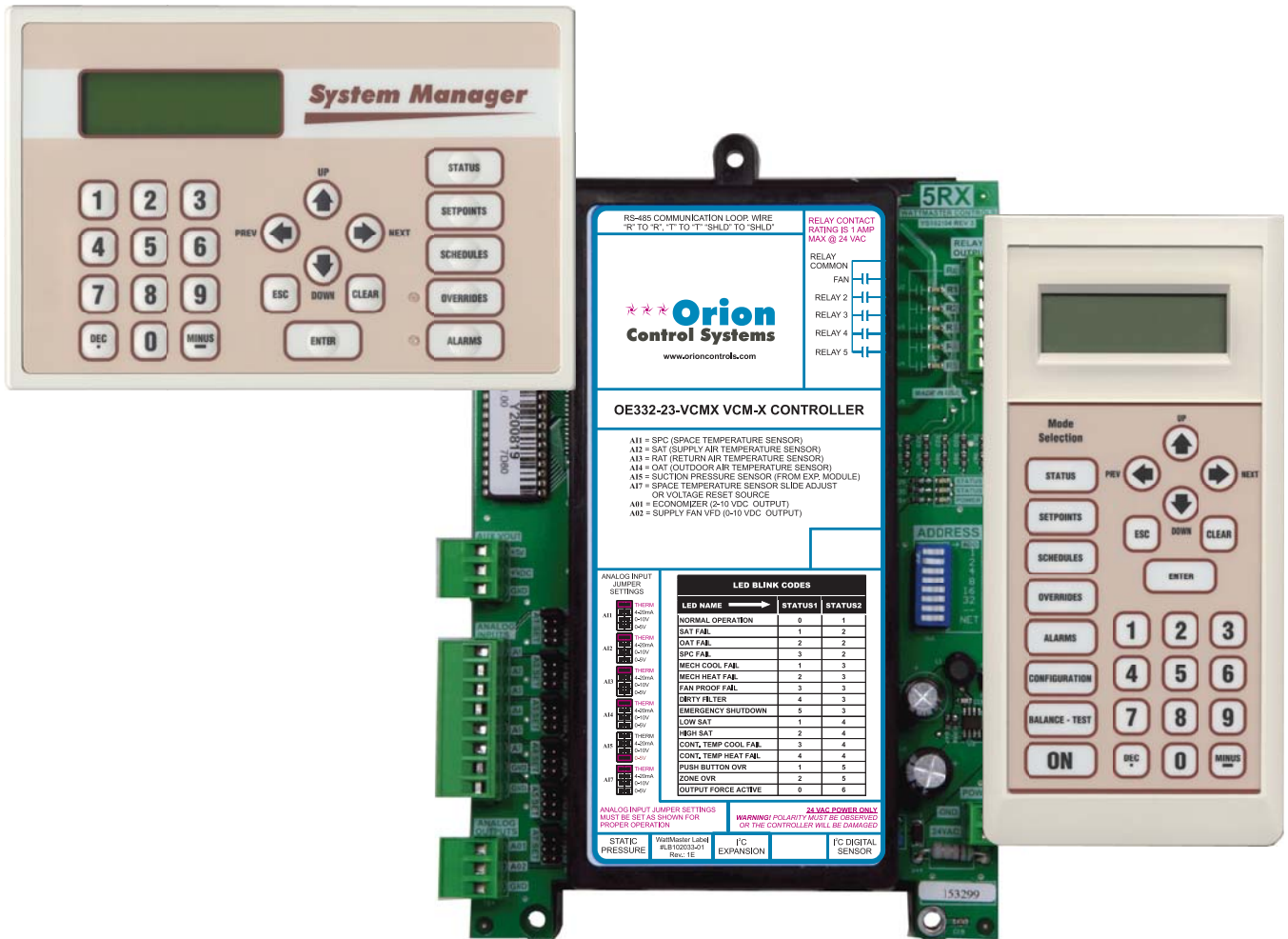


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Modular Service Tool

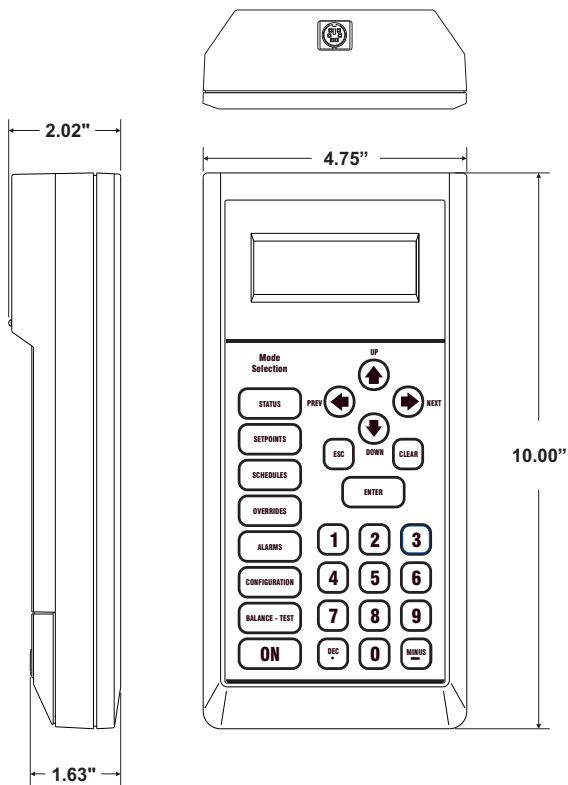


Figure 1: Modular Service Tool Dimensions

Description

The OE391-07 Modular Service Tool is a system operator interface that provides a direct link to enable the system operator to view the status, configure, and adjust the setpoints of any controller on the control system communications loop. The Modular Service Tool is housed in an attractive beige-colored plastic enclosure. The display area is covered with a clear plastic bezel for protection of the display screen. The Modular Service Tool has a 4-line-by-20-character display panel with adjustable contrast control and a 27-key membrane keypad for data selection and entry. All keypad operations are simple and 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 OE391-07 Modular Service Tool is supplied with (4) AA 1.5 V Volt alkaline batteries, a wall mount DC power supply and a communication cable terminated with an 8-pin DIN connector for connection to the Service Tool. The cable allows you to setup and program any Orion controller with an 8-pin DIN connector socket by simply plugging the service tool into the socket on the controller.

The Modular Service Tool is designed to be hand-carried. Its rugged plastic housing provides superior protection for the electronic components housed inside. The OE391-07 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.

Modular System Manager

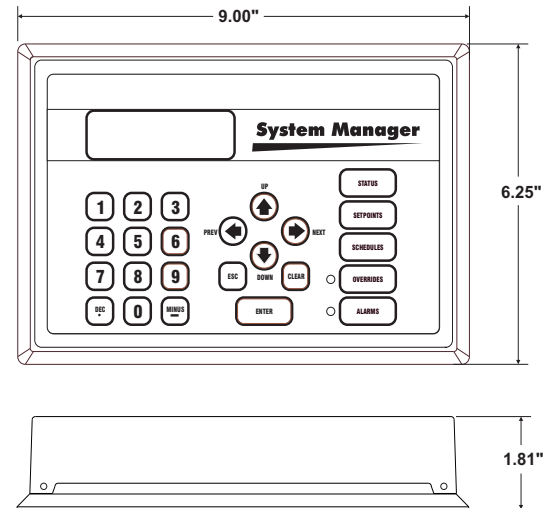


Figure 2: Modular System Manager Dimensions

Description

The OE392-07 Modular System Manager provides a direct link to enable you to view the status and adjust the setpoints of any controller on the control system communications loop. The Modular System Manager is designed to be used with the Orion Control System. The System Manager is housed in an attractive, off-white colored plastic enclosure. The System Manager is equipped with a 4-line-by-20-character backlit 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 Orion 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 or with most decor.

Modular Service Tool

Modular Service Tool

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

Be sure that the Modular Service Tool has fresh batteries installed or that it is connected to a power source using the supplied power pack before attempting any programming of the controller. See **Figure 3** for connection details.

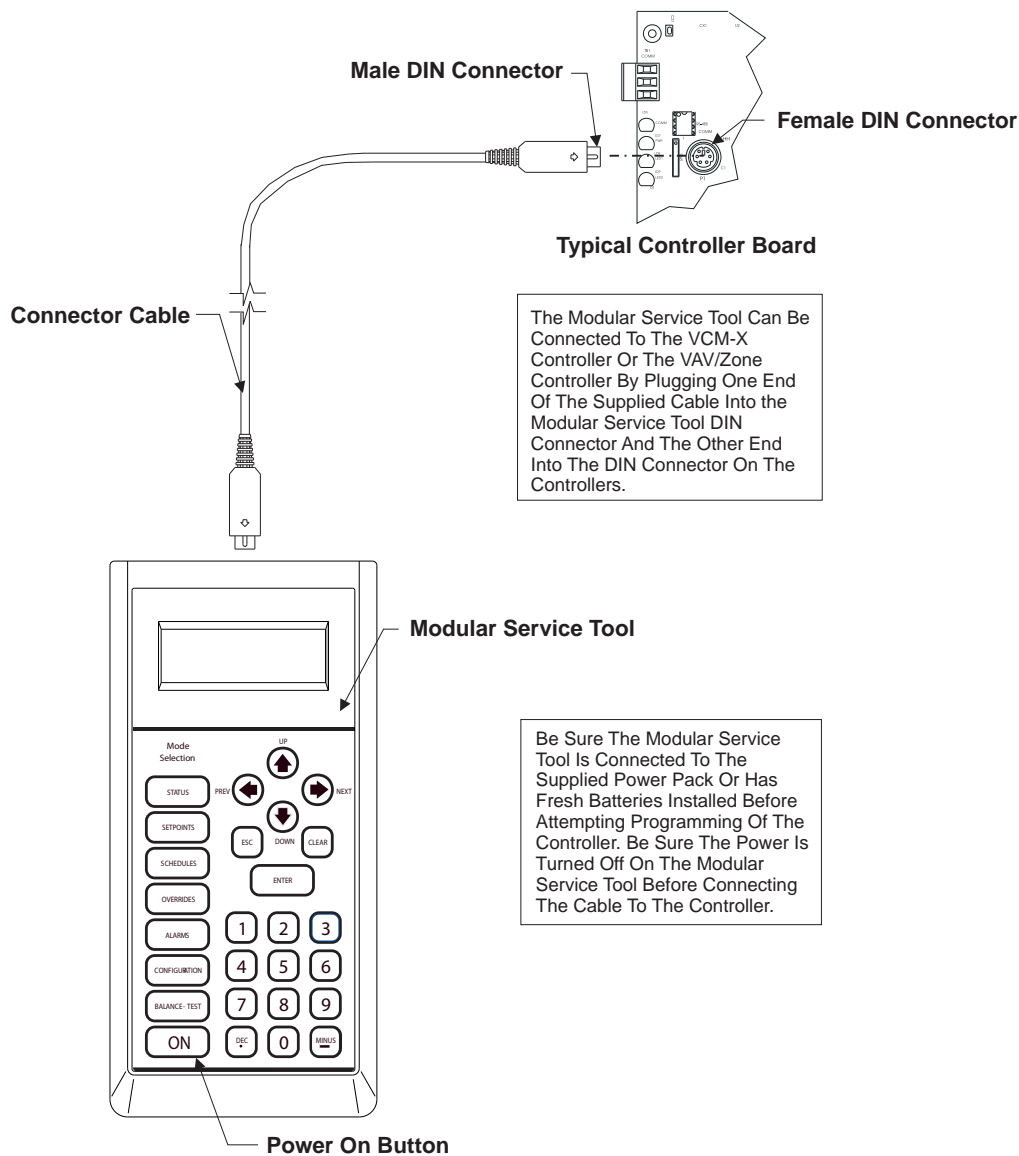


Figure 3: Modular Service Tool

Modular System Manager

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 6 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 7 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.

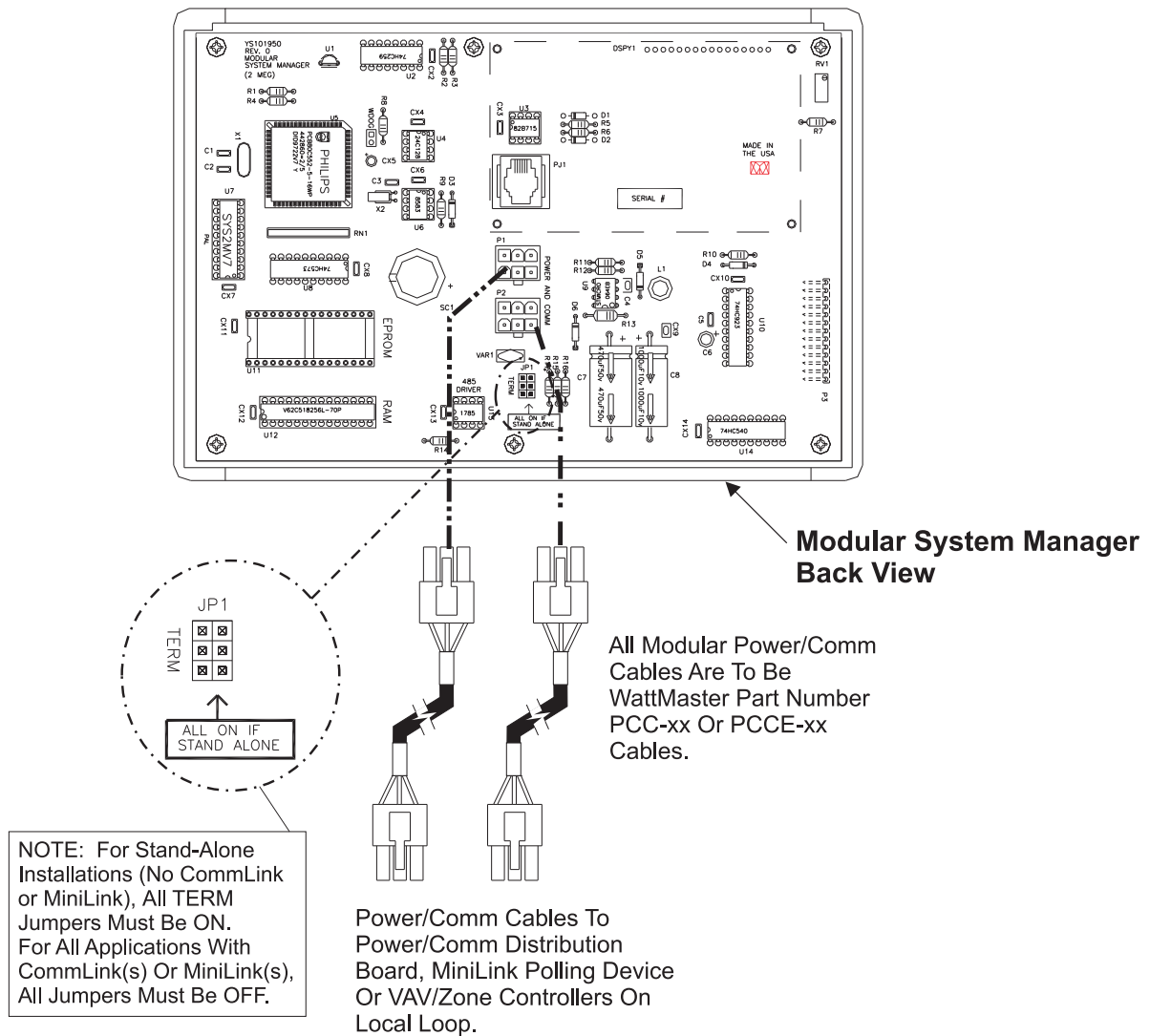


Figure 4: Modular System Manager - Networked

Modular System Manager - Stand Alone

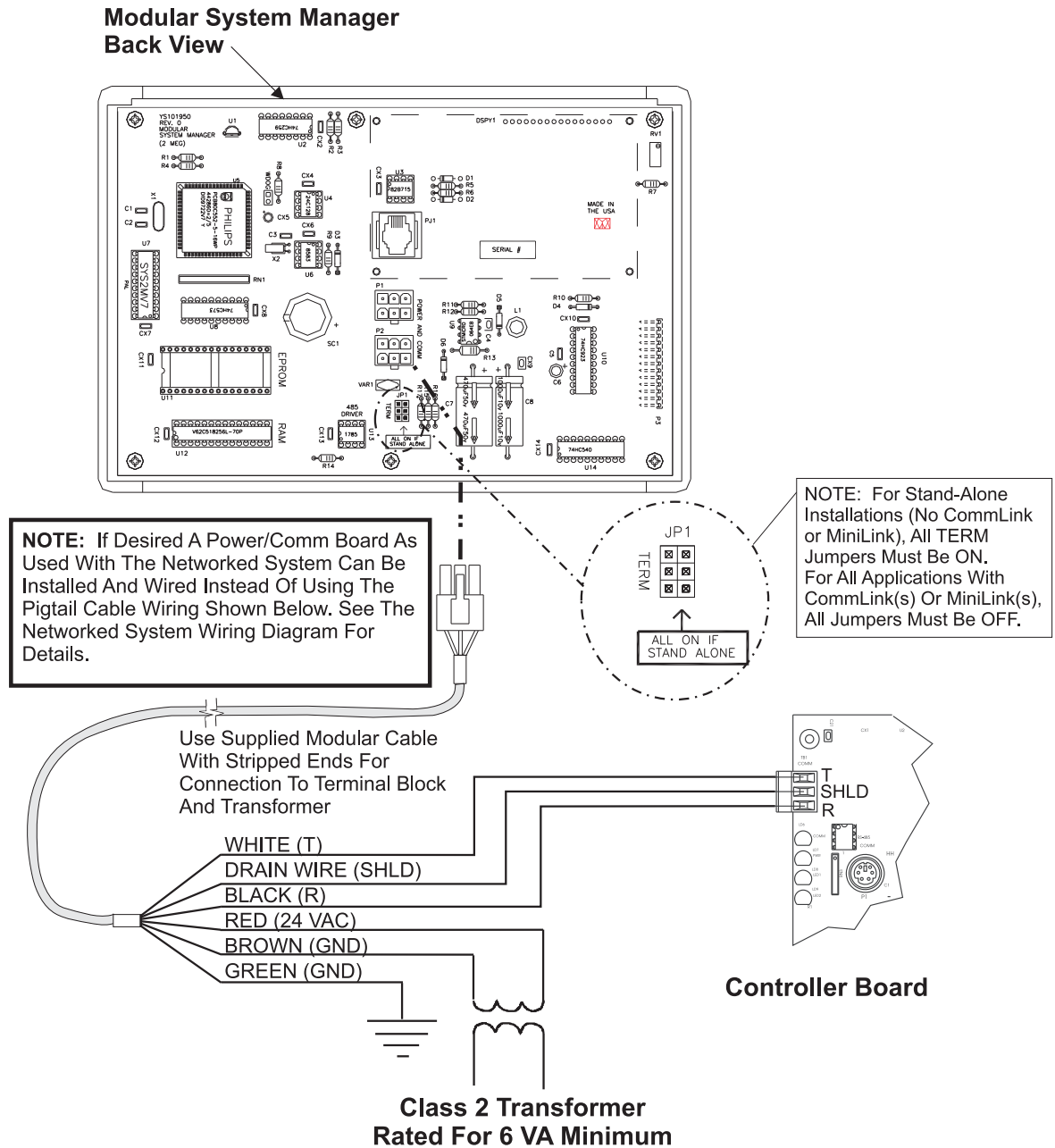
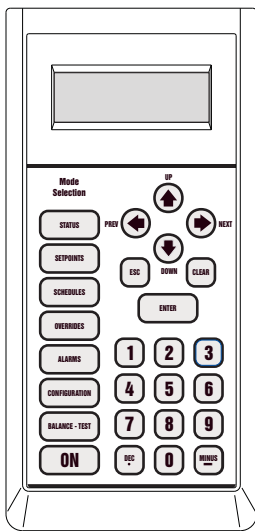


Figure 6: Modular System Manager - Stand Alone

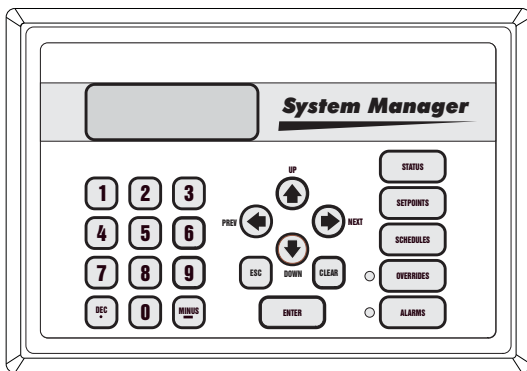
Service Tool and System Manager Keys

Operator Interfaces Comparison

In order to configure and program the Orion System controllers, you must have an Operator's Interface or a personal computer with the Prism II computer front-end software installed. Three different Operator Interfaces are available for programming of the Orion Controls System—the *Modular Service Tool*, the *Modular System Manager*, 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 and Modular System Manager. If using the System Manager TS, please see the *System Manager TS Operator's Guide*.



Modular Service Tool



Modular System Manager

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

Display Screens & Data Entry Keys

The System Manager's and Modular Service Tool's display screens are very similar. For most setpoints and modes, there are only a few difference in the function of the keypads. In this manual, when there are differences in the keypad input or the screens between the two operator's interfaces, both screens or keypads will be shown. See the chart below for a list of the keypad descriptions and functions.

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

Service Tool and System Manager Keys

Mode Selection Buttons

Both the System Manager and Modular Service Tool are 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. The Modular Service Tool has two extra function keys ("Configuration" and "Balance-Test") that are not available on the System Manager.

Button Description	Mode Selection Buttons	
	System Manager	ModularServiceTool
STATUS	Pressing this button takes you directly to the controller "Status" screens.	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.	Pressing this button takes you directly to the controller "Setpoints" screens.
SCHEDULES	Pressing this button takes you directly to the controller "Schedules" screens.	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 12 for a description of this function. See Notes 1 & 2 below.	Pressing this button takes you directly to the controller "Overrides" screen. See the "Override Button" section on page 14 for a description of this function. See Note 1 below.
ALARMS	Pressing this button takes you directly to the controller "Alarms" screen. See the "Alarms Button" section on page 11 for a description of this function. See Notes 1 & 2 below.	Pressing this button takes you directly to the controller "Alarms" screen. See the "Alarms Button" section on page 13 for a description of this function. See Note 1 below.
CONFIGURATION	Not Available. Use "Setpoints" Button to access Menu.	Pressing this button takes you directly to the controller "Configuration" screens.
BALANCE-TEST	Not available.	Pressing this button takes you directly to the controller "Balance-Test" screens.

Notes:

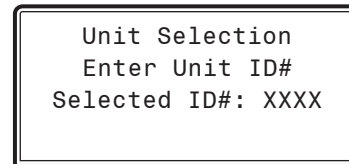
(1) This button only functions when the system is configured for "Network Mode" or "Multiple MGRS Mode." It will not function in "Stand Alone Mode."

(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 "System Manager NM & MM Loop Search" section of this manual for complete instructions on performing a loop search.

Service Tool and System Manager

Entering Unit ID (Address)

With both the Modular Service Tool and System Manager, you must enter the ID (Address) of the controller you wish to program.



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

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

If this is a Stand Alone System (system without a CommLink), the Unit ID will be a number between 1 and 59. It is recommended the address be set to 1. See Example #3 below.

EXAMPLE #1

You would like to view the 3rd controller on the 5th loop. *Enter* "503" as the Unit ID.

EXAMPLE #2

You would like to view the 12th controller on the 24th loop. *Enter* "2412" as the Unit ID.

EXAMPLE #3

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

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

System Manager Initialization

Modular System Manager

System Manager Initialization Screens

When the System Manager is powered up, the first screen displays the current version of the software installed in your System Manager and your system's configuration—Network or Stand-Alone operation.

```
Initializing
System Manager vX.XX
WattMaster Controls
Stand-Alone Mode
```

```
System Manager vX.XX
Monday Operations
02/15/10 04:26 PM
NM Outdoor Air 87°F
```

The screen above will appear a few seconds later. The last line of the display will have the letters SA (Stand-Alone Mode), MM (Multiple System Manager Mode), or NM (Network Mode) followed by the current outdoor air temperature. The System Manager normally ships from the factory set for SA (Stand-Alone Mode). If you do not have a CommLink or MiniLink polling device on your system and have one or more controllers connected and only one System Manager, the system must be set for SA (Stand-Alone Mode). If you have a CommLink or MiniLink polling device on your system and only have a single System Manager, the system must be set for NM (Network Mode). If you have a CommLink or MiniLink polling device on your system and have multiple System Managers on your System, the system must be set for MM (Multiple System Managers Mode). If you believe your system is incorrectly configured, please read the instructions that follow. If your system is configured correctly, proceed to the System Manager Network Mode Loop Search section on page 11.

Configuring for Stand-Alone Mode, Multiple System Managers Mode, or Network Mode

The System Manager must be configured for the correct mode of operation for your system. There are 3 modes of operation available for the Orion System—**Stand-Alone**, **Multiple MGRS**, and **Network Mode**. Look at the bottom line of the display as mentioned in the previous paragraph and determine which mode your System Manager is currently set for. 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 **Stand-Alone Mode**. The first two characters on the bottom line of the display should be SA. 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**. The first two characters on the bottom line of the display should be MM. If you are using this System Manager on a communications loop that has a MiniLink PD or CommLink installed and you have a single System Manager for your entire system, then you need to operate in **Network Mode**. The first two characters on the bottom line of the display should be NM.

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

```
1) Set Time & Date
2) Communications
->) Next Menu
ESC) Exit Menu
```

Press <2> on the keypad to enter the *Communications Screen*.

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

Enter the seven digit passcode "2337377" to access the next screen. These seven digits spell the word "ADDRESS" on your telephone keypad.

You will then see the screen below displayed. You must use the keypad to enter the correct number for the mode of operation needed for your system.

```
0) Stand Alone
1-60) Multiple MGRS
63) Network System
Enter Mode of Op:.xx
```

For **Stand Alone Mode**, *press* <0>.

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 *enter* <63> for **Network Mode** on that particular System Manager.

For **Network Mode** (or as explained above for Multiple System Managers when one is to be set to indicate alarms and overrides), *enter* <63>.

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 NM & MM Mode 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.

Note: The Loop Search function is only required when using the System Manager(s), not the Modular Service Tool.

To access the *Loop Search Screen*, from the *Main Menu Screen*, press <Enter>.

```

1) Set Time & Date
2) Communications
->) Next Menu
ESC) Exit Menu
    
```

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

```

1) Change Passcodes
2) Loop Search
<-) Prev. Menu
ESC) Exit Menu
    
```

Press <2> 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 Polling Devices 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 Polling Device to the Network System.

System Manager 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 56 of this manual for setting information. Press <Alarm>. The *Unit Selection Screen* below will be displayed. Enter the Unit ID of any unit on the system and press <Enter>. The alarm search will begin with the unit you enter. The entire system is searched from this point.

```

Unit Selection
Enter Unit ID#
Selected ID#: XXXX
    
```

The following screen will appear. The System Manager will search for any active alarms on the entire system.

```

Alarm Screen

SEARCHING!
    
```

After the System Manager completes its search, it will list the first unit on the system that currently has an active alarm. Press <Enter> to scroll through all the alarms on that particular unit. To move to the next unit or back to the previous unit, use the "Prev" or "Next" arrows to move between units with alarms.

```

Alarm Search Screen
Loop = 1 Unit = 59
Space Sensor Failure
    
```

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 Passcodes

System Manager Override Search

When a space sensor with override option is used with any VAV/Zone controller or VCM-X controller, the System Manager can determine and report any controllers that are currently operating in an override condition. This function requires that a MiniLink Polling Device 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 56 of this manual for setting information.

To access the *Space Sensor Overrides Screen*, press <Overrides>, located on the System Manager keypad. A screen will appear asking you to enter a unit ID. Enter an ID for any active controller on the system and press <Enter>. 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 <⇒> or <⇐> button to scroll through all units that are in the Override Mode.

```
Overrides Screen
Loop = 1  Unit = 59
Override Unit
```

System Manager Passcodes

Anytime you enter a unit ID with the Modular System Manager, you will be asked for a passcode. Passcodes are not required to view Status Screens. The screen below will appear if this action requires passcode clearance.

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

The System Manager has two levels of user access. Level 1 users are limited to viewing status and/or 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 <Enter>. The following screen will appear:

```
1) Set Time & Date
2) Communications
->) Next Menu
ESC) Exit Menu
```

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

```
1) Change Passcodes
2) Loop Search
<-) Prev. Menu
ESC) Exit Menu
```

Press <1> for Change Passcodes. The following screen will be displayed:

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

This screen allows you to enter new Level 1 or Level 2 passcodes. The actual digits in your passcodes are never displayed. An "X" is used as a place holder for each digit entered. 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!

Modular Service Tool Initialization

Modular Service Tool

The Modular Service Tool is very similar to the System Manager in its operations. Two exceptions to this are that unlike the System Manager, the Service Tool does not check the entire system when performing an “Alarm” or “Override” search, and it does not have any passcoding capability.

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

Modular Service Tool Initialization Screen

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

```
Service Tool  vX.XX
Monday Operations
02/15/10 04:26 PM
Stand Alone Mode
```

Configuring the Modular Service Tool for Network or Stand-Alone Operation

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

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

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

Press <2> to access the *Communications Screen*.

```
0) Stand Alone Mode
1) Network System

Enter Mode Of Op:.xx
```

Enter <0> or <1> to select the proper mode of operation. When you are finished, *press* <Enter> to return to the Main Menu.

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

Modular Service Tool Alarm Search

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

```
Unit Selection
Enter Unit ID#
Selected ID#: XXXX
```

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

```
Alarm Screen

SEARCHING!
```

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

```
Alarm Search Screen
Loop = 1  Unit = 59
Space Sensor Failure
```

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 Initialization

Modular Service Tool Override Search

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

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

```
Overrides Screen
SEARCHING!
```

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

```
Overrides Screen
Loop = 1  Unit = 59
Override Unit
```

Setting the Energy Saving Timer

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

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

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

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

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

Application Configurations

This area of the manual is designed to simplify the programming setup process for typical AAON® units that have factory installed VCM-X controllers. Special applications are also included to guide you through the setup process for more complicated configurations. The following configurations will step you through the Configuration Section of this manual. Not all configuration screens are listed in this section. This section is more of a quick setup guide for basic applications. Please read each description under the corresponding Configuration Screen in this manual to see if that option applies to your application. Setpoints are not shown here since they are not necessarily configuration-specific, but are based more on job requirements. Read the descriptions under the corresponding Setpoint Screens in this manual to understand which setpoints to use and what values are appropriate to enter.

VAV Unit

If you need to set up your HVAC unit for VAV operation, use the following values:

Configuration Section

Screen #1—Duct Static Pressure Control = “YES”

Screen #3—HVAC Mode Enable = “Supply Air” or “Supply Air/Tempering”

Screen #4—HVAC Reset Source = “No Reset”
Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.

Screen #9—Outdoor Humidity Sensor = “YES”
Only if equipped with an Outdoor Air Humidity Sensor for Wetbulb Control of Economizer.

Screen #12—Economizer Control = “YES”
Only if equipped with an Economizer.

Screen #13—Proof of Flow Input = “YES”
Only if equipped with a Proof of Flow switch.

Screen #32—CO₂ Sensor Output Signal = “2”
Only if standard CO₂ Sensor is installed for IAQ Control.

Screen #33—CO₂ Sensor Maximum Signal = “2000”
This is the proper CO₂ Sensor scaling for the Standard CO₂ Sensor.

Screen #34—Building Pressure Modulating Control = “YES”
Only if equipped with VFD exhaust fan or Modulating Exhaust Damper Actuator.

Screen #36—Building Pressure Output Signal = “0” or “1”
Configure the proper Building Pressure Output signal.

Screen #39—Emergency Shutdown Input = “YES”
Only if a Smoke Detector, Firestat, or other Shutdown device is connected to the VCM-X.

Screens #43 through #48 = “YES”
Only needed when connected to Orion VAV/Zone Controllers.

Screens #55 through #74 = Refer to the AAON® wiring diagram inside the unit before configuring on-board and expansion board relays.

CAV Unit

If you need to set up your HVAC unit for CAV operation, use the following values:

Configuration Section

Screen #1—Duct Static Pressure Control = “NO”

Screen #2—Supply Fan Cycle Mode = “NO”
Only configure as “YES” if the Supply Fan needs to be off when no Heating, Cooling, or Dehumidification demand exists.

Screen #3—HVAC Mode Enable = “Space Temperature”
Can be “Return Air.” For cooling-only units, select “Supply Air.”

Screen #4—HVAC Reset Source = “No Reset”
Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.

Screen #6—Dehumidification Control = “YES”
Only if the unit is equipped for Dehumidification.

Screen #7—Dehumidification Priority = “YES”

Screen #8—Dehumidification Unoccupied = “YES”
Only if Dehumidification is needed during the Unoccupied Mode.

Screen #9—Outdoor Humidity Sensor = “YES”
Only if equipped with an Outdoor Air Humidity Sensor for Wetbulb Control of Economizer.

Screen #10—Indoor Humidity Sensor = “YES”
Only if equipped with an Indoor Humidity Sensor for Dehumidification.

Screen #12—Economizer Control = “YES”
Only if the unit is equipped with an Economizer.

Screen #13—Proof of Flow Input = “YES”
Only if equipped with a Proof of Flow Switch.

Screen #32—CO₂ Sensor Output Signal = “2”
Only if standard CO₂ Sensor is installed for IAQ Control.

Screen #33—CO₂ Sensor Maximum Signal = “2000”
This is the proper CO₂ Sensor scaling for the Standard CO₂ Sensor.

Screen #34—Building Pressure Modulating Control = “YES”
Only if equipped with VFD Exhaust Fan or Modulating Exhaust Damper Actuator.

Screen #36—Building Pressure Output Signal = “0” or “1”
Configure the proper Building Pressure Output Signal.

Screen #39—Emergency Shutdown Input = “YES”
Only if a Smoke Detector, Firestat, or other Shutdown device is connected to the VCM-X.

Screens #55 through #74 = Refer to the AAON® wiring diagram inside the unit before configuring on-board and expansion board relays.

MUA, Heat Pump, and PAC Configurations

MUA Unit

If you need to set up your HVAC unit for MUA operation, use the following values:

Configuration Section

Screen #1—Duct Static Pressure Control = “NO”

Screen #3—HVAC Mode Enable = “Outdoor Air”

Screen #4—HVAC Reset Source = “No Reset”

Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.

Screen #6—Dehumidification Control = “YES”

Only if the unit is equipped for Dehumidification.

Screen #7—Dehumidification Priority = “YES”

Screen #8—Dehumidification Unoccupied = “YES”

Only if unit has Return Air and has been configured for Unoccupied Dehumidification Control.

Screen #9—Outdoor Humidity Sensor = “YES”

Only if equipped with an Outdoor Air Humidity Sensor for Dehumidification.

Screen #13—Proof of Flow Input = “YES”

Only if equipped with a Proof of Flow Switch.

Screen #34—Building Pressure Modulating Control = “YES”

Only if equipped with VFD Exhaust Fan or Modulating Exhaust Damper Actuator.

Screen #36—Building Pressure Output Signal = “0” or “1”

Configure the proper Building Pressure Output Signal.

Screen #39—Emergency Shutdown Input = “YES”

Only if a Smoke Detector, Firestat, or other Shutdown device is connected to the VCM-X.

Screens #55 through #74 = Refer to the AAON® wiring diagram inside the unit before configuring onboard and expansion board relays.

Heat Pump

Heat Pumps can be configured as VAV, CAV, or MUA. Configuration Screens #37 and #38 are used to configure the Heat Pump. A Relay Output must be configured for a Reversing Valve on Screens #37 and Screen #38 whether the Reversing Valve is to be activated during Heating or Cooling operation. When using AAON® equipment, if the equipment is an AAON® packaged unit, the Reversing Valve activates during Heating operation. If the equipment is an AAON® split system, the Reversing Valve activates during Cooling operation. No matter which type of AAON® or other manufacturer’s equipment you are using, you must determine if the Reversing Valve should be energized during Heating or during Cooling and configure it on Screen #38 or the unit will not operate correctly.

Configuration Section

Screen #37—Heat Pump Control = “YES”

Screen #38—Reversing Valve Active During Heat/Cool =

“0=Heat” if the Reversing Valve should energize for Heating operation; “1=Cool” if the Reversing Valve should energize for Cooling operation.

Screens #55 through #74 = Refer to the AAON® wiring diagram inside the unit before configuring on-board and expansion board relays.

Precision Air Control Units (PAC)

This application is only valid for CAV units with Space Temperature as the HVAC Mode Enable. All other configuration screens that apply to the CAV will apply to PAC.

Configuration Section

Screen #1—Duct Static Pressure Control = “NO”

Screen #2—Supply Fan Cycle Mode = “NO”

Screen #3—HVAC Mode Enable = “Space Temperature”

Screen #4—HVAC Reset Source = “No Reset”

Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.

Screens #55 through #74 = Refer to the AAON® wiring diagram inside the unit before configuring on-board and expansion board relays.

Digital Precision Air Control Units (DPAC)

This application is only valid for CAV units with Space Temperature as the HVAC Mode Enable. All other configuration screens that apply to the CAV will apply to DPAC.

Configuration Section

Screen #1—Duct Static Pressure Control = “NO”

Screen #2—Supply Fan Cycle Mode = “NO”

Screen #3—HVAC Mode Enable = “Space Temperature”

Screen #4—HVAC Reset Source = “No Reset”

Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.

Screen #14—Modulating Heating/Cooling = Mod Cooling: “YES”

Screen #19—Digital Compressor Signal = “YES”

Screen #21—Modulating Cooling Proportional Window = This setpoint is for signal control. Read the description under the screen before determining the appropriate values to enter for the Window and Time Period.

Screens #55 through #74 = Refer to the AAON® wiring diagram inside the unit before configuring on-board and expansion board relays. Configure one cooling relay per compressor. This includes both digital and fixed-capacity compressors.

Exhaust Hood Applications (Dual Outdoor Air Damper Modes)

This is typically used for kitchen and lab applications that require 100% outdoor air when the exhaust hood is on and minimum outdoor air when the exhaust hood is off.

In the Occupied Mode, the VCM-X controller will operate under Space Temperature and Indoor Humidity control when the Exhaust Hood is off. When the Exhaust Hood is on and the “Exhaust Hood On” input is active, the VCM-X controller will switch to Outdoor Air Temperature and Outdoor Air Dewpoint control.

In the Unoccupied Mode, the VCM-X controller will operate under Space Temperature and Indoor Humidity control only.

Configuration Section

Screen #1—Duct Static Pressure Control = “NO”

Screen #3—HVAC Mode Enable = “Space Temperature”

Screen #4—HVAC Reset Source = “No Reset”

Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.

Screen #6—Dehumidification Control = “YES”

Screen #7—Dehumidification Priority = “YES”

Screen #8—Dehumidification Unoccupied = “YES”

Only if Dehumidification is needed during the Unoccupied Mode.

Screen #9—Outdoor Humidity Sensor = “YES”

Screen #10—Indoor Humidity Sensor = “YES”

Screen #12—Economizer Control = “NO”

Screen #13—Proof of Flow Input = “YES”

Only if equipped with a Proof of Flow Switch.

Screen #34—Building Pressure Modulating Control = “YES”

Only if equipped with VFD Exhaust Fan or Modulating Exhaust Damper Actuator.

Screen #36—Building Pressure Output Signal = “0” or “1”

Configure the proper Building Pressure Output Signal.

Screen #39—Emergency Shutdown Input = “YES”

Only if a Smoke Detector, Firestat, or other Shutdown device is connected to the VCM-X.

Screens #55 through #74 = Refer to the AAON® wiring diagram inside the unit before configuring on-board and expansion board relays.

VCM-X Configuration Screen Index

VCM-X Configuration Screen Index

The available Configuration Screens for the VCM-X controller are listed on the next few pages by sequential screen number. When each VCM-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 VCM-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 VCM-X Configuration Screens in numerical order with a brief listing of the configuration feature available on each screen.

Screen #1	Duct Static Pressure Control	Screen #24	Split Condenser (VCM-X Modular/WSHP)
Screen #2	Supply Fan Cycle Mode	Screen #25	Monitor Outdoor Air CFM
Screen #3	HVAC Mode Enable	Screen #26	Control Outdoor Air CFM
Screen #4	HVAC Reset Source	Screen #27	Outdoor Duct/Damper Size
Screen #5	Reset Interval Rate	Screen #28	Monitor Return Air CFM
Screen #6	Dehumidification Control	Screen #29	Return Duct/Damper Size
Screen #7	Dehumidification Priority	Screen #30	Monitor Supply Air CFM
Screen #8	Dehumidification Unoccupied	Screen #31	Supply Duct/Damper Size
Screen #9	Outdoor Humidity Sensor	Screen #32	CO ₂ Sensor Output Signal
Screen #10	Indoor Humidity Sensor	Screen #33	CO ₂ Sensor Maximum Scale
Screen #11	Heat During Dehumidify	Screen #34	Building Pressure Modulating Control
Screen #12	Economizer Control	Screen #35	Building Pressure Reverse Acting
Screen #13	Proof of Flow Input	Screen #36	Building Pressure Output Signal
Screen #14	Modulating Cooling/Heating	Screen #37	Heat Pump Control
Screen #15	Modulating Heat Output Signal	Screen #38	Reversing Valve Active For Heat/Cool
Screen #16	Modulating Heat Reverse Acting	Screen #39	Emergency Shutdown Input
Screen #17	Modulating Heat Proportional Window	Screen #40	Return Air Bypass Control
Screen #18	Modulating Cooling Output Signal	Screen #41	Broadcast Outdoor Temperature
Screen #19	Digital Compressor Signal	Screen #42	Broadcast Outdoor Humidity
Screen #20	Modulating Cooling Reverse Acting	Screen #43	Broadcast Supply Temperature
Screen #21	Modulating Cool Proportional Window	Screen #44	Broadcast Status Fan & Heat
Screen #22	Head Pressure Module Installed (VCM-X Modular/WSHP)	Screen #45	Broadcast Internal Time Clock
Screen #23	Full Digital Module Installed/WSHP with Multiple Digital Scroll Compressors OR Dual Digital Module/WSHP with Two Digital Scroll Compressors Installed (VCM-X Modular/WSHP)	Screen #46	Broadcast Internal Schedule
		Screen #47	Broadcast VAV Boxes Force to Max
		Screen #48	Broadcast VAV Boxes Force to Fixed
		Screen #49	1 HVAC Unit w/Boxes on Multiple Loops
		Screen #50	Unit Uses R410A Refrigerant
		Screen #51	Main Fan Maximum Voltage
		Screens #52-55	Cooling & Heating Staging Delays
		Screens #56-75	Relay Configuration Screens

Configuration Screens

In order to correctly set up the VCM-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.

System Manager Instructions

No matter what screen or menu you're in, *press* <Setpoints>. The *Unit Selection Screen* will appear, requesting that you enter the unit ID number. *Enter* the correct unit ID number of the VCM-X controller you want to configure and *press* <Enter>. You will see the screen shown below.

```

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

Press <2> to enter Configuration Screen #1.

Modular Service Tool Instructions

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

Configuration Screen #1 - Duct Static Pressure

```

VCM-X Cnfg ID 59
Duct Static Pressure
Control: YES
[0=NO 1=YES]
    
```

If the HVAC unit has a Supply Fan that delivers a Constant Volume of air, *enter* <0> for NO. If the HVAC unit has a Supply Fan that delivers a Variable Volume of Air using a VFD or a Bypass Damper, *enter* <1> for YES. Default is YES.

Configuration Screen #2 - Supply Fan Cycle

```

VCM-X Cnfg ID 59
Supply Fan Cycle
Mode: NO
[0=NO 1=YES]
    
```

If you want the HVAC unit's Supply Fan to run during Heating, Cooling, or Dehumidification Modes, *enter* <1> for YES. If you want the HVAC unit's Supply Fan to run continuously while in the Occupied Mode, regardless of the Heating, Cooling, or Dehumidification Modes, *enter* <0> for NO. Default is NO.

Configuration Screen #3 - HVAC Mode Enable

```

VCM-X Cnfg ID 59
HVAC Mode Enable
Supply Air
Press "0" to Change
    
```

Enter <0> to select the Temperature Sensor that will determine the Heating, Cooling, or Vent Mode of operation. The selections are:

- **Supply Air**
This is typical for VAV applications. Occupied Cooling with Morning Warm-up.
- **Outdoor Air**
This is for 100% Outdoor Air (MUA) units. Dehumidification utilizes a Dewpoint Calculation if equipped with an Outdoor Air Humidity Sensor.
- **Space Temperature**
This is for any unit that conditions a space and is not 100% Outdoor air. Occupied/Unoccupied Heating, Cooling, and Vent Modes of operation.
- **Return Air**
This selection can be used when an Average Building Temperature (the Return Air Temperature) needs to determine Heating, Cooling, and Vent Modes of operation.
- **Supply Air/Tempering**
This selection is for VAV "cooling only" applications where because of cold outdoor temperatures, even at minimum damper position, you may need to enable heat to maintain the cooling near its Cooling Supply Air Setpoint. When heat is enabled during this sequence, it will control to a non-adjustable setpoint that is 2°F less than the Cooling Supply Air Setpoint. Includes a Morning Warm-up sequence.

Configuration Screen #4 - HVAC Reset Source

```

VCM-X Cnfg ID 59
HVAC Reset Source
No Reset
Press "0" to Change
    
```

The Supply Air Heating and Cooling Temperature Setpoints can be reset using various input sources. Default is No Reset. *Enter* <0> to change/ select the desired Reset Source for Supply Air Temperature Reset. The Single Zone VAV option should be selected in applications where the Supply Fan VFD speed is reset based on the Space Temperature. If you select No Reset, then neither the Supply Air Setpoint nor the Supply Fan VFD Reset will occur. The selections are:

- **No Reset**
- **Space Sensor**
- **Return Air Sensor**
- **Remote Reset Signal**
- **Fan VFD Percentage**
- **Outdoor Sensor**
- **Single Zone (SZ) VAV**
- **SZ VAV with CV Heating**

VCM-X Configuration Screens

Configuration Screen #5 - Reset Interval Rate

```
VCM-X Cnfg ID 59
Reset Interval
Rate...: 20 s
[1-250 Seconds]
```

If you selected Space or Return Air Temperature Reset in Screen #4, enter a value in seconds between 1-250. This value determines how fast the Supply Air Temperature Setpoint is adjusted as the Reset Source changes. Default is 20 seconds.

Configuration Screen #6 - Dehumidification Control

```
VCM-X Cnfg ID 59
Dehumidification
Control: NO
[0=NO 1=YES]
```

Enter <1> for YES if your system requires Dehumidification Control. Enter <0> for NO. Default is NO.

Configuration Screen #7 - Dehumidification Priority

```
VCM-X Cnfg ID 59
Dehumidification
Priority: NO
[0=NO 1=YES]
```

Enter <1> for YES if Dehumidification is a Priority during the Occupied Mode. Priority means that the Cooling stages will activate based on Coil Temperature and Reheat will be used regardless of Heating, Cooling, or Vent Modes of Operation. Enter <0> for NO.

Configuration Screen #8 - Dehumidification Unoccupied

```
VCM-X Cnfg ID 59
Dehumidification
Unoccupied: NO
[0=NO 1=YES]
```

Enter <1> for YES if Dehumidification is required during the Unoccupied mode. Unoccupied Dehumidification is activated based on Indoor Air Humidity only. Enter <0> for NO. Default is NO.

Configuration Screen #9 - Outdoor Humidity Sensor

```
VCM-X Cnfg ID 59
Outdoor Humidity
Sensor: NO
[0=NO 1=YES]
```

Enter <1> for YES if the HVAC unit is equipped with an Outdoor Air Humidity Sensor. Enter <0> for NO. Default is NO.

Configuration Screen #10 - Indoor Humidity Sensor

```
VCM-X Cnfg ID 59
Indoor Humidity
Sensor: NO
[0=NO 1=YES]
```

Enter <1> for YES if the HVAC unit is equipped with an Indoor Air Humidity Sensor. Enter <0> for NO. Default is NO.

Configuration Screen #11 - Heat During Dehumidify

```
VCM-X Cnfg ID 59
Heat During
Dehumidify: NO
[0=NO 1=YES]
```

Enter <1> for YES if your application needs to use unit heat during Dehumidification to supplement Reheat. If Reheat is not available, this selection will allow unit heat to operate in place of Reheat. Enter <0> for NO. Default is NO.

Configuration Screen #12 - Economizer Control

```
VCM-X Cnfg ID 59
Economizer
Control: NO
[0=NO 1=YES]
```

Enter <1> for YES if the VCM-X is controlling the Economizer. Enter <0> for NO. Default is NO.

VCM-X Configuration Screens

Configuration Screen #13 - Proof of Flow Input

```
VCM-X Cnfg ID 59
Proof Of Flow
Input: NO
[0=NO 1=YES]
```

Enter <1> for YES if the unit is equipped with a Proof of Flow Switch and it is connected to the VCM-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. Enter <0> for NO. Default is NO.

Configuration Screen #14 - Modulating Cooling/ Heating

```
VCM-X Cnfg ID 59
Mod Cooling: NO
Mod Heating: NO
[0=NO 1=YES]
```

Enter <1> for YES if the HVAC unit is controlling Modulating Heating or Modulating Cooling or both. If your HVAC unit is going to use a Modulating Chilled Water Valve or is equipped with a Digital Compressor, you must select YES for Modulating Cooling. If your HVAC is using a Modulating Hot Water Valve, Modulating Steam Valve, or a SCR Controlled Electric Heater, you must select YES for Modulating Heating. This configuration does not apply to MODGAS using the MODGAS Controller. Enter <0> for NO. Default is NO.

Configuration Screen #15 - Modulating Heating Output Signal

```
VCM-X Cnfg ID 59
Mod Heating
Output Signal.: 0
[0=0-10V 1=2-10V]
```

Enter <0> for a 0-10 VDC signal to a Modulating Heat Source such as a Hot Water Valve or SCR Electric Heater. Enter <1> for a 2-10 VDC signal to a Hot Water Valve or SCR Electric Heater. Default is 0.

Configuration Screen #16 - Modulating Heating Reverse Acting

```
VCM-X Cnfg ID 59
Mod Heating
Rev Acting: NO
[0=NO 1=YES]
```

Enter <1> for YES if the Modulating Heat Source requires 0 VDC to open and 10 VDC to close. Enter <0> for NO. Default is NO.

Configuration Screen #17 - Modulating Heating Proportional Window

```
VCM-X Cnfg ID 59
Mod Heating
Prop. Window.: 10°F
Time Period.: 5 s
```

The Modulating Heating Proportional Window is the control range of the Modulating Signal above and below the Active Supply Air Setpoint. The larger the Modulating Heating Proportional Window, the smaller the signal adjustment per Time Period will be for each °F the supply air is from the Active Supply Air Temperature Setpoint. The Time Period is the delay before another signal increase or decrease can be made and is user-adjustable. Short Time Periods may cause hunting of the Modulating Signal. Defaults are 10°F and 5 seconds.

Configuration Screen #18 - Modulating Cooling Output Signal

```
VCM-X Cnfg ID 59
Mod Cooling
Output Signal: 0
[0= 0-10V 1= 2-10V]
```

Enter <0> for a 0-10 VDC signal to a Modulating Cool source such as a Chilled Water Valve. Enter <1> for a 2-10 VDC signal to a Chilled Water Valve. Default is 0.

Configuration Screen #19 - Digital Compressor Signal

```
VCM-X Cnfg ID 59
Digital Compressor
Signal 1-5V : NO
[0=NO 1=YES]
```

Enter <1> for YES if the HVAC unit is equipped with a Digital Compressor. Enter <0> for NO. Default is NO.

VCM-X Configuration Screens

Configuration Screen #20 - Modulating Cooling Reverse Acting

```
VCM-X Cnfg ID 59
Mod Cooling
Rev Acting: NO
[0=NO 1=YES]
```

Enter <1> for YES if the Modulating Cooling Source requires 0 VDC to open and 10 VDC to close. You cannot use a Reverse Acting Signal if a Digital Compressor is being used. Enter <0> for NO. Default is NO.

Configuration Screen #21 - Modulating Cooling Proportional Window

```
VCM-X Cnfg ID 59
Mod Cooling
Prop. Window.: 10°F
Time Period...: 30 s
```

The Modulating Cooling Proportional Window is the control range of the Modulating Signal above and below the Active Supply Air Setpoint. The larger the Modulating Cooling Proportional Window, the smaller the signal adjustment per Time Period will be for each °F the supply air is from the Active Supply Air Temperature Setpoint. The Time Period is the delay before another signal increase or decrease can be made and is user-adjustable. Short Time Periods may cause hunting of the Modulating Signal. Defaults are 10°F and 30 seconds.

Configuration Screen #22 - Head Pressure Module Installed

```
VCMX-M/HP Cnfg ID 102
Head Pressure
Module Installed: NO
[0=NO 1=YES]
```

Enter <1> for YES if you have a Head Pressure Module installed. Enter <0> for NO. This screen only applies if using the VCM-X Modular or WSHP Controller. Default is NO.

Configuration Screen #23 - Full Digital Module/WSHP w/Multiple Digital Scroll Compressors OR Dual Digital Module/WSHP w/2 Digital Scroll Compressors Installed

```
VCMX-M/HP Cnfg ID 102
Full Digital Module
Installed: NO
[0=NO 1=YES]
```

If a VCM-X Modular Controller (OE332-23-VCMX-MOD-A) or VCM-X WSHP Controller (OE332-23-VCMX-WSHP-A) is being used, this screen will appear. Enter <1> for YES if you have either a Full Digital Module installed or if you have a Water Source Heat Pump Module installed and in both cases all the compressors in the unit are Digital Scroll Compressors (2 Digital Compressors only or all 4 Digital Compressors). If you have a combination of Digital Compressors and Fixed Compressors, enter <0> for NO.

```
VCMX-M/HP Cnfg ID 102
Dual Digital Module
Installed: NO
[0=NO 1=YES]
```

If a VCM-X Modular Controller (OE332-23-VCMX-MOD-C) or VCM-X WSHP Controller (OE332-23-VCMX-WSHP-C) is being used, this screen will appear. Enter <1> for YES if you have a Dual Digital Module installed or if the VCM-X WSHP Controller has two Digital Scroll Compressors. Enter <0> for NO.

Configuration Screen #24 - Split Condenser

```
VCMX-M/HP Cnfg ID 102
Is this a
Split Condenser: NO
[0=NO 1=YES]
```

Enter <1> for YES if you have a Split Condenser with two physically separate condenser sections. This requires a Two Condenser Head Pressure Module. Enter <0> for NO. This screen only applies if using the VCM-X or WSHP Modular Controller. Default is NO.

VCM-X Configuration Screens

Configuration Screen #25 - Monitor Outdoor Air CFM

```
VCM-X Cnfg ID 59
Monitor Outdoor
Air CFM: NO
[0=NO 1=YES]
```

Enter <1> for YES if you have an Airflow Monitoring station measuring the CFM of the Outdoor airflow stream of this unit. Enter <0> for NO. Default is NO.

Configuration Screen #26 - Control Outdoor Air CFM

```
VCM-X Cnfg ID 59
Control Outdoor
Air CFM: NO
[0=NO 1=YES]
```

Enter <1> for YES if you want to control the Outdoor Air Damper to a CFM setpoint. Enter <0> for NO. Default is NO.

Configuration Screen #27 - Outdoor Duct/Damper Size

```
VCM-X Cnfg ID 59
Outdoor Duct/Damper
Size: 0.00
[Area in sq. ft.]
```

For the controller to properly calculate the outside air CFM you need to enter the inside area (sq. ft.) of the outdoor air duct/damper. When measuring the outdoor air damper area, be sure to measure the inside dimensions of the damper. The more accurate the measurements, the more accurate the CFM reading will be. This value needs to be accurate to 2 decimal places. Default is 0.00.

Configuration Screen #28 - Monitor Return Air CFM

```
VCM-X Cnfg ID 59
Monitor Return
Air CFM: NO
[0=NO 1=YES]
```

Enter <1> for YES if you have an airflow monitoring station measuring the CFM of the return airflow stream of this unit. Enter <0> for NO. Default is NO.

Configuration Screen #29 - Return Duct/Damper Size

```
VCM-X Cnfg ID 59
Return Duct/Damper
Size: 0.00
[Area in sq. ft.]
```

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 damper area, be sure to measure the inside dimensions of the damper. The more accurate the measurements, the more accurate the CFM reading will be. This value needs to be accurate to 2 decimal places. Default is 0.00.

Configuration Screen #30 - Monitor Supply Air CFM

```
VCM-X Cnfg ID 59
Monitor Supply
Air CFM: NO
[0=NO 1=YES]
```

Enter <1> for YES if you have an airflow monitoring station measuring the CFM of the supply airflow stream of this unit. Enter <0> for NO. Default is NO.

Configuration Screen #31 - Supply Duct/Damper Size

```
VCM-X Cnfg ID 59
Supply Duct/Damper
Size: 0.00
[Area in sq. ft.]
```

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 duct damper area, be sure to measure the inside dimensions of the damper. The more accurate the measurements, the more accurate the CFM reading will be. This value needs to be accurate to 2 decimal places. Default is 0.00.

VCM-X Configuration Screens

Configuration Screen #32 - CO₂ Sensor Output Signal

```
VCM-X Cnfg ID 59
CO2 Sensor
Output Signal: 0
[0=None 1=mA 2=VDC]
```

The VCM-X needs to know what type of CO₂ sensor signal output is being provided. *Enter <2>* for a 0-10 VDC CO₂ sensor signal (standard sensor used). *Enter <1>* for a 4-20 mA CO₂ sensor signal. *Enter <0>* if no CO₂ sensor is used. Default is None.

Configuration Screen #33 - CO₂ Sensor Maximum Scale

```
VCM-X Cnfg ID 59
CO2 Sensor Maximum
Scale: 2000 PPM
Enter 0 If No Sensor
```

Default is 2000 PPM. The VCM-X needs to know the CO₂ Sensor scaling for proper reading of the CO₂ Sensor output. The Standard CO₂ Sensor should be scaled to 2000 PPM. *Enter <0>* if no CO₂ sensor is used. Default is 2000.

Configuration Screen #34 - Building Pressure Modulating Control

```
VCM-X Cnfg ID 59
Building Pressure
Mod Control: NO
[0=NO 1=YES]
```

Enter <1> for YES if Modulating Building Pressure Control is needed. Modulating Building Pressure Control is used for a VFD Exhaust Fan or a Modulating Exhaust Fan Damper Actuator for Direct Acting Building Pressure Control. Modulating Building Pressure Control is also used for a modulating outdoor air damper actuator for Reverse Acting Building Pressure Control. *Enter <0>* for NO if Modulating Building Pressure Control is not needed when using a Constant Volume Exhaust Fan for On/Off Control. Default is NO.

Configuration Screen #35 - Building Pressure Reverse Acting

```
VCM-X Cnfg ID 59
Building Pressure
Rev Acting: NO
[0=NO 1=YES]
```

Enter <1> for YES if Reverse Acting Building Pressure control is needed. Reverse Acting Building Pressure Control can either be On/Off or Modulating Control. Modulating Control is normally used for this configuration. On a drop in Building Pressure, below the Building Static Pressure Setpoint, the Outdoor Air Damper will modulate open to increase pressure. *Enter <0>* for NO. Default is NO.

Configuration Screen #36 - Building Pressure Output Signal

```
VCM-X Cnfg ID 59
Building Pressure
Output Signal: 0
[0=0-10V 1=2-10V]
```

This Screen is used to configure the Building Pressure Output Signal voltage needed for your application. You can select either a 0-10 VDC signal (default) or *enter <1>* to make the output signal 2-10 VDC as required by the device you are using to control the pressure. *Enter <0>* for 0-10 VDC. Default is 0.

Configuration Screen #37 - Heat Pump Control

```
VCM-X Cnfg ID 59
Heat Pump
Control: NO
[0=NO 1=YES]
```

Enter <1> for YES if the HVAC unit is a Heat Pump. *Enter <0>* for NO. Default is NO.

Configuration Screen #38 - Reversing Valve Active During Heat/Cool

```
VCM-X Cnfg ID 59
Rev. Valve Active
For: Cool
[0=Heat 1=Cool]
```

Enter <0> for Heat if your Heat Pump unit activates its Reversing Valve during Heating operation. *Enter <1>* for Cool if your Heat Pump unit activates its Reversing Valve during Cooling operation. Default is Heat.

VCM-X Configuration Screens

Configuration Screen #39 - Emergency Shutdown Input

VCM-X Cnfg ID 59
Emergency Shutdown
Input: NO
[0=NO 1=YES]

Enter <1> for YES if a Smoke Detector/Firestat or other Emergency Shutdown input is connected to the binary input. If the Emergency Shutdown input is active, the Supply Fan, Heating and Cooling Relay Outputs will be disabled. Enter <0> for NO. Default is NO.

Configuration Screen #40 - Return Air Bypass Control

VCM-X Cnfg ID 59
Return Air Bypass
Control: NO
[0=NO 1=YES]

Enter <1> for YES if your HVAC unit requires Return Air Bypass Control for Dehumidification Reheat. Enter <0> for NO. Default is NO.

Configuration Screen #41 - Broadcast OA Temp

VCM-X Cnfg ID 59
Broadcast Outdoor
Temperature: NO
[0=NO 1=YES]

The VCM-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 is needed in order for this feature to operate. Enter <1> for YES - Broadcast Outdoor Temperature. Enter <0> for NO. Default is NO.

Configuration Screen #42 - Broadcast OA Humidity

VCM-X Cnfg ID 59
Broadcast Outdoor
Humidity: NO
[0=NO 1=YES]

The VCM-X can broadcast its Outdoor Air Humidity reading to other HVAC units if they are not equipped with their own Outdoor Air Humidity sensors. A network communications device is required in order for this feature to operate. Enter <1> for YES - Broadcast Outdoor Humidity. Enter <0> for NO. Default is NO.

Configuration Screen #43 - Broadcast Supply Temperature

VCM-X Cnfg ID 59
Broadcast Supply
Temperature: YES
[0=NO 1=YES]

This broadcast sends the VCM-X's Supply Air Temperature to all controllers on its local loop. This broadcast needs to be configured on a VAV or Zoning System using the VCM-X with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate. Enter <1> for YES or <0> to NO. Default is NO.

Configuration Screen #44 - Broadcast Status Fan & Heat

VCM-X Cnfg ID 59
Broadcast Status
Fan & Heat: NO
[0=NO 1=YES]

This broadcast sends the VCM-X's Supply Fan and Heating Status to all controllers on its local loop. This broadcast needs to be configured on a VAV or Zoning System using the VCM-X with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate. Enter <1> for YES or <0> for NO. Default is NO.

Configuration Screen #45 - Broadcast Internal Time Clock

VCM-X Cnfg ID 59
Broadcast Internal
Time Clock: NO
[0=NO 1=YES]

This broadcast sends the time from the VCM-X's Internal Time Clock to all controllers on its local loop. This broadcast needs to be configured on a VAV or Zoning System using the VCM-X with Orion VAV/Zone controllers. A network communications device is required in order for this feature to operate, but can also be used to synchronize all controllers on the local loop. Enter <1> for YES or <0> for NO. Default is NO.

VCM-X Configuration Screens

Configuration Screen #46 - Broadcast Internal Schedule

```
VCM-X Cnfg ID 59
Broadcast Internal
Schedule: NO
[0=NO 1=YES]
```

This is always required when you have VAV/Zone controllers connected to this VCM-X controller. This will broadcast the Occupied and Unoccupied Condition of the VCM-X controller to all VAV/Zone controllers on the local loop. *Enter <1>* for YES or <0> for NO. Default is NO.

Configuration Screen #47 - Broadcast VAV Boxes Force to Max

```
VCM-X Cnfg ID 59
Broadcast VAV Boxes
Force To Max: YES
[0=NO 1=YES]
```

This broadcast is to ensure the VAV/Zone Controllers will drive their dampers to the Max Airflow Damper Position during Morning Warm-up. This is important to allow the proper amount of airflow for Heating in the HVAC unit. *Enter <1>* for YES or <0> for NO. Default is YES.

Configuration Screen #48 - Broadcast VAV Boxes Force to Fixed

```
VCM-X Cnfg ID 59
Broadcast VAV Boxes
Force To Fixed: NO
[0=NO 1=YES]
```

Enter <1> for YES to have all VAV/Zone controllers connected to this VCM-X controller forced to their “Fixed Airflow” Position during the Morning Warm-up Mode of operation. *Enter <0>* for YES if you do not want this to occur. See the VAV/Zone controller Setpoint Screens for setting of the “Fixed Airflow” position. Default is NO.

Configuration Screen #49 - 1 HVAC Unit with Boxes on Multiple Loops

```
VCM-X Cnfg ID 59
1 HVAC Unit w/ Boxes
On Multi. Loops: NO
[0=NO 1=YES]
```

Enter <1> for YES to have all broadcasts that have been configured on Configuration Screens 43 through 48 sent to all local loops on the entire system, not just the local loop the VCM-X controller is on. This is normally only required if you have a large HVAC unit that requires more than the 58 VAV/Zone controllers normally allowed on the local loop. This allows other VAV/Zone controllers connected on additional local loops to receive the required broadcasts. This only is allowed when you have a single VCM-X controller with VAV/Zone controllers on multiple loops. Other VCM-X or add-on devices may be connected but no other VCM-X with VAV/Zone controllers can be connected on the system. *Enter <0>* for NO. Default is NO.

Configuration Screen #50 - Uses R410A Refrigerant

```
VCM-X Cnfg ID 59
Unit Uses R410A
Refrigerant: NO
[0=NO 1=YES]
```

Enter <1> for YES if your HVAC unit uses R410A Refrigerant. *Enter <0>* for NO. Default is 1.

Configuration Screen #51 - Main Fan Maximum Voltage

```
VCM-X Cnfg ID 59
Max Main Fan Aout
Voltage: XX.X VDC
```

Enter a value between 0.0 and 10.0 VDC for the main fan’s maximum output voltage. The *Static Pressure and Output % Status Screen* will display 0% to 100%, but the output will range from 0 VDC to the value set in this screen. Default is 0 VDC.

This screen will appear if using a If a VCM-X Modular Controller (OE332-23-VCMX-MOD-A or OE332-23-VCMX-MOD-C) or VCM-X WSHP Controller (OE332-23-VCMX-WSHP-A or OE332-23-VCMX-WSHP-C).

VCM-X Configuration Screens

Configuration Screens #52-55 - Cooling & Heating Stage Delays

VCM-X Cnfg ID 59
Cooling Stage Delays
Staging Up...: 3 Min
Staging Down : 1 Min

VCM-X Cnfg ID 59
Cooling Stage Delays
Min Run Time: 5 Min
Min Off Time: 3 Min

VCM-X Cnfg ID 59
Heating Stage Delays
Staging Up...: 3 Min
Staging Down : 1 Min

VCM-X Cnfg ID 59
Heating Stage Delays
Min Run Time: 2 Min
Min Off Time: 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.

Both modes have their own set of Staging and Run Delay Times. The Heating Timer Screens look exactly the same as the Cooling Timer Screens except they reference the Heating settings instead of the Cooling settings.

See the *Sequence of Operation Manual* 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	2 Min	15 Min
Heating Min Off Time	1 Min	1 Min	15 Min

Configuration Screens #56-75 - Relay Configuration Screens

VCM-X Cnfg ID 59
Relay Configurations
Rly xx: Not Used
Press "0" To Change

Relay #1 is not configurable as it is reserved for the Supply Air Fan. Relays #2-#21 are configurable for the following options:

- Not Used
- Heat Stage
- Cool Stage
- Warmup Mode
- Rev Valve
- HGR
- Exhaust Fan
- Pre-Heater
- Alarm
- Override
- Occupied
- OA Damper
- Heat Wheel
- Emerg. Heat

Relays #2 through #21 can be individually configured. By using the 4 relay outputs available on the VCM-X Controller, the 4 relays on the VCM-X Expansion Module, and the 12 relays on the 12 Relay Expansion Module, you have the ability to configure up to a combined total of 20 Heating Stages, Cooling Stages, and the rest of the options listed above. Only the Heating and Cooling relays can be configured with multiple outputs. 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."

VCM-X Setpoint Screens

Setpoints - General Procedures

System Manager Instructions

From any menu screen, *press* <Setpoints>. The *Unit Selection Screen* will appear requesting that you enter the unit ID number. *Enter* the correct unit ID number of the VCM-X controller you want to change Setpoints for and *press* <Enter>. You will see the screen shown below.

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

Enter <1> on the keypad to display the first unit Setpoint screen.

Modular Service Tool Instructions

From any menu screen, *press* <Setpoints>. The *Unit Selection Screen* will appear requesting that you enter the unit ID number. *Enter* the correct unit ID number of the VCM-X controller you want to change Setpoints for and *press* <Enter>. You will then see Setpoint Screen #1.

Setpoint Screen Index

The available Setpoint Screens for the VCM-X controller are listed on the next few pages by sequential screen number. When each VCM-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 VCM-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 VCM-X Setpoint Screens in numerical order with a brief listing of the Setpoint feature available on each screen:

Setpoint Screen #1	HVAC Mode Setpoints
Setpoint Screen #2	HVAC Mode Select Deadband
Setpoint Screen #3	Unoccupied Setbacks
Setpoint Screen #4	SAT Cooling Setpoints
Setpoint Screen #5	Cool Reset Source Setpoints
Setpoint Screen #6	SAT Heating Setpoints
Setpoint Screen #7	Heat Reset Source Setpoints
Setpoint Screen #8	Stage Control Window
Setpoint Screen #9	Outdoor Air Lockouts
Setpoint Screen #10	Cutoff Temperatures Lo SAT & Hi SAT
Setpoint Screen #11	Minimum Supply Fan VFD Speed For Heating
Setpoint Screen #12	Morning Warm-up Target Temp & Max Length

Setpoint Screen #13	Dehumidification Indoor RH & OA Dewpoint
Setpoint Screen #14	Dehumidification Coil Temperature
Setpoint Screen #15	Cooling Head Pressure Setpoint (VCM-X Modular/WSHP)
Setpoint Screen #16	Reheat Head Pressure Setpoint (VCM-X Modular/WSHP)
Setpoint Screen #17	Economizer Setpoints OAT/WB Enable
Setpoint Screen #18	Economizer Setpoints Min Position & Control Rate
Setpoint Screen #19	Outdoor Air CFM Min & Max Control
Setpoint Screen #20	Outdoor Air CFM Deadband
Setpoint Screen #21	Maximum Economizer Position if High CO ₂ Level Occurs
Setpoint Screen #22	CO ₂ Protection Limit Max Level & Reset Range
Setpoint Screen #23	Static Setpoint, Deadband & Control Rate
Setpoint Screen #24	Building Pressure Setpoint & Deadband
Setpoint Screen #25	Return Air Bypass Damper Factor Setpoint
Setpoint Screen #26	Fan Starting Delay Timer
Setpoint Screen #27	Mechanical Heat Cool Failures Occur After No Change For
Setpoint Screen #28	Preheat/Low Ambient Temperature
Setpoint Screen #29	Max OA Damper Tempering Limit
Setpoint Screen #30	HVAC Schedule
Setpoint Screen #31	Push-Button Override Duration
Setpoint Screen #32	HVAC Mode Sensor Slide Offset
Setpoint Screen #33	Heat Pump Auxiliary Heating Delay
Setpoint Screen #34	Heat Pump Defrost Temp and Defrost Timer (VCM-X Modular)
Setpoint Screen #35	Adaptive Defrost Adjustment (VCM-X Modular)
Setpoint Screen #36	Heat Wheel Defrost
Setpoint Screen #37	Internal Schedule Optimal Start Soak Multiplier
Setpoint Screen #38	Trend Log Interval
Setpoint Screen #39	Sensor Calibration For SPC & SAT
Setpoint Screen #40	Sensor Calibration For RAT & OAT
Setpoint Screen #41	Sensor Calibration For Coil

VCM-X Setpoint Screens

Setpoint Screen #1 - HVAC Mode Setpoints

```
VCM-X Spts ID 59
HVAC Mode Setpoints
Cooling.....: 75°F
Heating.....: 70°F
```

These Setpoints are used to determine the Heating, Cooling, or Vent Modes of operation in reference to the HVAC Mode Enable Sensor. If the Supply Air Sensor is configured to be the HVAC Mode Enable, these Setpoints are used in conjunction with the Unoccupied Setbacks if equipped with a Space Temperature Sensor.

Description	Minimum	Default	Maximum
HVAC Mode Setpoints Cooling	0°F	75°F	99°F
HVAC Mode Setpoints Heating	0°F	70°F	99°F

Setpoint Screen #2 - HVAC Mode Select Deadband

```
VCM-X Spts ID 59
HVAC Mode Select
Deadband.....: 1.0°F
```

This Setpoint is added to and subtracted from the HVAC Mode Setpoints. It provides you with flexibility on when the Heating and Cooling Modes should be active above or below the HVAC Mode Setpoints.

Description	Minimum	Default	Maximum
HVAC Mode Select Deadband	0°F	1°F	10°F

Setpoint Screen #3 - Unoccupied Setbacks

```
VCM-X Spts ID 59
Unoccupied Setbacks
Cooling.....: 30°F
Heating.....: 30°F
```

During the Unoccupied Mode of Operation, these Setpoints spread the HVAC Mode Setpoints out by a 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 Setbacks Cooling	0°F	30°F	30°F
Unoccupied Setbacks Heating	0°F	30°F	30°F

Setpoint Screen #4 - SAT Cooling Setpoints

```
VCM-X Spts ID 59
SAT Cooling Spts
Cooling...: 55°F
Rst Limit: 55°F
```

If no Reset Source has been configured in Configuration Screen #4, then this setpoint will be the Supply Air Temperature Cooling Setpoint. Line 4 will be blank. If a Reset Source has been configured in Configuration Screen #4, then Line 4 will read Rst Limit. 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 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 (next screen) moves within its range.

Description	Minimum	Default	Maximum
SAT Cooling Setpoint	40°F	55°F	80°F
Cooling Reset Limit	40°F	55°F	150°F

Setpoint Screen #5 - Cool Reset Source

```
VCM-X Spts ID 59
Cool Rst Source Spts
SpcHi: 75   SAT: 55°
SpcLo: 75   RST: 55°
```

If no Reset Source has been configured in Configuration Screen #4, then this screen will read Cool Rst Not Config and will not be used. If a Reset Source has been configured in Configuration Screen #4, then the names of the values on the left side of this screen will correspond to the Reset Source that was configured. This screen will then allow you to input the upper and lower limits for the range of values of the Reset Source on the left side of the screen and will show the corresponding Cooling Supply Air SAT and Rst Limit values that were entered on the previous screen. Single Zone VAV Reset of the Supply Fan VFD is addressed in the last paragraph.

Please note that the SAT and Rst Limit values on the right side of this screen cannot be changed on this screen; they are simply displayed from what was entered on the Setpoint Screen #4. For each line, the value on the left corresponds to the value on the right. So, if the Space Temperature Sensor has been configured as the Reset Source, then when the Space Temperature is at or above the SpcHi Temperature Setpoint, the Supply Air Cooling Setpoint will be reset to its lowest value, the SAT Setpoint. If the Space Temperature is at or below the SpcLo Setpoint, the Supply Air Cooling Setpoint will be reset to its highest value, the Cooling Rst Limit. Then, as the Space Temperature moves from its low value to its high value, the Supply Air Cooling Setpoint will be proportionally reset from its high value to its low value.

VCM-X Setpoint Screens

Depending on whether reset has been configured or not, the options for the names of the values on the left side of the screen are SpcHi, SpcLo, OatHi, OatLo, RatHi, RatLo, VLT, VFD, NoRST.

In the examples that follow, the desired Space Temperature in Cooling Mode is 75°F:

Space Temperature Cool Reset:

Space Temperature (SPC Hi) = 75°F SAT Setpoint (SAT) = 55°F
 Space Temperature (SPC Lo) = 74°F SAT Setpoint (Rst) = 65°F

VFD Percentage Cool Reset:

VFD Percentage (VFD) = 70% SAT Setpoint (SAT) = 55°F
 VFD Percentage (VFD) = 30% SAT Setpoint (Rst) = 65°F

Input Voltage Cool Reset:

Input Voltage (VLT) = 0 Volts SAT Setpoint (SAT) = 55°F
 Input Voltage (VLT) = 10 Volts SAT Setpoint (Rst) = 65°F

In the Cooling Mode in a Single Zone VAV application, the Supply Fan VFD speed will proportionally modulate as the Space Temperature rises within the range set on this screen. Upon entering the Cooling Mode, the fan will start at 30% and modulate up to 100% as the Space Temperature rises from the SpcLo Setpoint to the SpcHi Setpoint. The SpcLo Setpoint should be the same as the Space Cooling Setpoint (Mode Enable Setpoint) from Setpoint Screen #1. The SAT and RST Setpoints on the right side of the screen are not used.

Setpoint Screen #6 - SAT Heating Setpoints

If no Reset Source has been configured in Configuration Screen #4, then this setpoint will be the Supply Air Temperature Heating Setpoint. Line 4 will be blank. If a Reset Source has been configured in Configuration Screen #4, then Line 4 will read Rst Limit. 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 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 (next screen) moves within its range.

VCM-X Spts ID 59	
SAT Heating Spts	
Heating..:	120°F
Rst Limit:	120°F

Description	Minimum	Default	Maximum
SAT Heating Spt	40°F	120°F	200°F
Reset Limit Spt	40°F	120°F	200°F

Setpoint Screen #7 - Heat Reset Source

VCM-X Spts ID 59	
Heat Rst Source Spts	
SpcHi: 70	SAT: 120°
SpcLo: 70	RST: 120°

If no Reset Source has been configured in Configuration Screen #4, then this screen will read Heat Rst Not Config and will not be used. If a Reset Source has been configured in Configuration Screen #6, then the names of the values on the left side of this screen will correspond to the Reset Source that was configured. This screen will then allow you to input the upper and lower limits for the range of values of the Reset Source on the left side of the screen and will show the corresponding Heating Supply Air SAT and Rst Limit values that you entered on the previous screen. Single Zone VAV Reset of the Supply Fan VFD is addressed in the last paragraph.

Please note that the SAT and Rst Limit values on the right side of this screen cannot be changed on this screen; they are simply displayed from what was entered on the Setpoint Screen #6. For each line, the value on the left corresponds to the value on the right. So if the Space Temperature Sensor has been configured as the Reset Source, then when the Space Temperature is at or above the SpcHi Temperature Setpoint, the Supply Air Heating Setpoint will be reset to its lowest value, the SAT Setpoint. If the Space Temperature is at or below the SpcLo Setpoint, the Supply Air Heating Setpoint will be reset to its highest value, the Heating Rst Limit. Then, as the Space Temperature moves from its low value to its high value, the Supply Air Heating Setpoint will be proportionally reset from its high value to its low value.

Depending on whether reset has been configured or not, the options for the names of the values on the left side of the screen are SpcHi, SpcLo, OatHi, OatLo, RatHi, RatLo, VLT, VFD, NoRST.

In the examples that follow, the desired Space Temperature in Heating Mode is 71°F:

Space Temperature Heat Reset:

Space Temperature (SPC Hi) = 71°F SAT Setpoint (SAT) = 90°F
 Space Temperature (SPC Lo) = 70°F SAT Setpoint (Rst) = 120°F

VFD Percentage Heat Reset:

VFD Percentage (VFD) = 30% SAT Setpoint (SAT) = 90°F
 VFD Percentage (VFD) = 70% SAT Setpoint (Rst) = 120°F

Input Voltage Heat Reset:

Input Voltage (VLT) = 0 Volts SAT Setpoint (SAT) = 90°F
 Input Voltage (VLT) = 10 Volts SAT Setpoint (Rst) = 120°F

In the Heating Mode in a Single Zone VAV application, the Supply Fan VFD speed will proportionally modulate as the Space Temperature falls within the range set on this screen. Upon entering the Heating Mode, the fan will start at 50% and modulate up to 100% as the Space Temperature falls from the SpcHi Setpoint to the SpcLo Setpoint. The SpcHi Setpoint should be the same as the Space Heating Setpoint (Mode Enable Setpoint) from Setpoint Screen #1. The SAT and RST Setpoints on the right side of the screen are not used.

VCM-X Setpoint Screens

Setpoint Screen #8 - Stage Control Window

```
VCM-X Spts ID 59
Stage Control Window
Cooling.....: 5°F
Heating.....: 5°F
```

When the VCM-X controller is in Cooling Mode, if the Supply Air Temperature drops below the Active Supply Air Temperature Setpoint minus the Cooling Stage Control 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 Temperature Setpoint plus the Heating Stage Control Window value, a Heating stage will be deactivated after its Minimum Run Time. This staging window is also used for the coil temperature during Dehumidification Mode.

Description	Minimum	Default	Maximum
Stage Control Window Cooling	5°F	5°F	30°F
Stage Control Window Heating	5°F	5°F	30°F

Setpoint Screen #9 - Outdoor Air Lockouts

```
VCM-X Spts ID 59
Outdoor Air Lockouts
Cooling.....: 50°F
Heating.....: 70°F
```

The VCM-X will Lockout Mechanical Heating or Cooling when the Outdoor Air (OA) Temperature is above or below these Setpoints.

On Air to Air Heat Pump units, Compressor Cooling and Heating can only operate if the OA Temperature is above the Outdoor Air Cooling Lockouts. If using the VCM-X WSHP (Water Source Heat Pump) Controller, the OA Cooling Lockout is ignored. Since Emergency Heat can only be used below the Compressor Lockouts, Emergency Heat is therefore not available on WSHP units using the VCM-X WSHP Controller.

Description	Minimum	Default	Maximum
OA Lockouts Cooling	0°F	50°F	100°F
OA Lockouts Heating	50°F	70°F	150°F

Setpoint Screen #10 - Cutoff Temperature

```
VCM-X Spts ID 59
Cutoff Temperatures
Lo SAT.....: 40°F
Hi SAT.....: 170°F
```

The VCM-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 Temperature Setpoint or falls below the Lo SAT Cutoff Temperature Setpoint. See the *VCM-X Controller Technical*

Guide for detailed information on the Lo and Hi Supply Air Temperature Cutoff sequence of operation.

Description	Minimum	Default	Maximum
Lo SAT Cutoff	0°F	40°F	250°F
Hi SAT Cutoff	0°F	170°F	250°F

Setpoint Screen #11 - Minimum Supply Fan VFD Speed For Heating

```
VCM-X Spts ID 59
Minimum Supply
Fan VFD Speed
For Heating.: 30%
```

If the Supply Fan VFD Signal falls below the Minimum Supply Fan VFD Speed For Heating Setpoint, Heating will be disabled.

Description	Minimum	Default	Maximum
Min Supply Fan VFD Speed For Heating	0%	30%	100%

Setpoint Screen #12 - Morning Warm Up Temp

```
VCM-X Spts ID 59
Morning WarmUp
Target Temp: 72°F
Max Length.: 60 Min
```

When the VCM-X is configured for VAV operation and the controller enters the Occupied Mode, the VCM-X looks at the Return Air Temperature to determine if the unit should initiate Morning Warm-up Mode. If the Return Air Temperature is below the Morning Warm-up Target Temperature and the Max Length is greater than "0," the VCM-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.

Description	Minimum	Default	Maximum
Morning Warm Up Target Temp	50°F	72°F	90°F
Morning Warm Up Max Length	0 Min	60 Min	240 Min

VCM-X Setpoint Screens

Setpoint Screen #13 - Dehumidification Indoor RH & OA Dewpoint

VCM-X Spts ID 59
 Dehumidification Spt
 Indoor RH....: 50%
 OA Dewpoint...: 55°F

On VAV or CAV configured units that are not using 100% Outdoor Air, when the Indoor Relative Humidity percentage rises above the Indoor RH Setpoint, the unit will start operating in Dehumidification Mode.

If an Indoor Humidity Sensor is installed, the unit will reset the Coil Suction Temperature Setpoint as needed to maintain this Indoor RH Setpoint. This includes VAV, CAV and MUA applications.

On MUA configured units that are using 100% Outdoor Air, when the Outdoor Air Dewpoint Temperature rises above the OA Dewpoint Setpoint, the unit will start operating in Dehumidification Mode.

Description	Minimum	Default	Maximum
Dehumidification Setpoint Indoor RH	1%	50%	100%
Dehumidification Setpoint OA Dewpoint	35°F	55°F	80°F

Setpoint Screen #14 - Dehumidification Coil Temperature

VCM-X Spts ID 59
 Dehumidification
 Coil Temperature
 Setpoint.....: 45°F

During the Dehumidification Mode, the VCM-X uses the calculated Coil Temperature to activate DX Cooling based on this Dehumidification Coil Temperature Setpoint. The VCM-X uses a Suction Pressure Transducer to read Suction Pressure (the Saturation Vapor Pressure of the Refrigerant) and converts this Suction Pressure reading to a Coil Temperature value. This calculation is based on using R22 or R410A refrigerant only and will not work with any other refrigerant. This setpoint determines the number of compressor stages that need to be activated to maintain the Dehumidification Coil Temperature Setpoint.

Description	Minimum	Default	Maximum
Dehumidification Coil Temperature Setpoint	35°F	45°F	70°F

Setpoint Screen #15 - Cooling Head Pressure Setpoint

VCMX-M/HP Spts ID 102
 Cooling
 Head Pressure
 Setpoint: 315PSI

If you are using the Head Pressure Module, this is the Cooling Setpoint for control of the condenser fan speed. This is based on the highest head pressure reading of up to 4 Head Pressure Sensors. This screen only applies if using the VCM-X Modular or WSHP Controller.

See the *One Condenser Head Pressure Module Technical Guide* or the *Two Condenser Head Pressure Module Technical Guide* for detailed information.

Description	Minimum	Default	Maximum
Cooling Head Pressure Setpoint	200 PSI	315 PSI	400 PSI

Setpoint Screen #16 - Reheat Head Pressure Setpoint

VCMX-M/HP Spts ID 102
 Reheat
 Head Pressure
 Setpoint: 400PSI

If you are using the Head Pressure Module, this is the Reheat Setpoint for control of the condenser fan speed during dehumidification. This is based on the highest head pressure reading of up to 4 Head Pressure Sensors. This screen only applies if using the VCM-X Modular or WSHP Controller.

See the *One Condenser Head Pressure Module Technical Guide* or the *Two Condenser Head Pressure Module Technical Guide* for detailed information.

Description	Minimum	Default	Maximum
Reheat Head Pressure Setpoint	200 PSI	400 PSI	400 PSI

VCM-X Setpoint Screens

Setpoint Screen #17 - Economizer OAT/WB Enable

```
VCM-X Spts ID 59
Economizer Setpoints
OAT/WB Enable: 55°F
```

If an Outdoor Air Humidity Sensor is not connected to the VCM-X and the Outdoor Air Temperature falls below this Setpoint, the Economizer can be used for Free Cooling. If an Outdoor Air Humidity Sensor is connected to the VCM-X, then a Wetbulb Temperature will be calculated and used instead of the Outdoor Air Drybulb Temperature to determine when Free Cooling can be used.

Description	Minimum	Default	Maximum
Economizer Setpoints OAT/WB Enable	0°F	55°F	80°F

Setpoint Screen #18 - Economizer Minimum Position & Control Rate

```
VCM-X Spts ID 59
Economizer Setpoints
Min Position.: 10 %
Control Rate.: 90
```

The Economizer (OA Damper) Min Position Setpoint is maintained during the Occupied Mode even if the Economizer is disabled due to the OA Temperature or Wetbulb Temperature being above the Economizer Enable Setpoint. The Control Rate Setpoint allows you to adjust the Economizer to modulate the OA Damper Actuator faster or slower as desired. The Control Rate Setpoint range is 1-99. Larger numbers make the Economizer Outdoor Air Damper Actuator modulate faster, smaller numbers make the Outdoor Air Damper Actuator modulate slower.

Description	Minimum	Default	Maximum
Economizer Min Position	0%	10%	100%
Economizer Control Rate	10	90	99

Setpoint Screen #19 - Outdoor Air CFM Control

```
VCM-X Spts ID 59
OA CFM CONTROL
Min CFM.: 0.10 K
Max CFM.: 0.10 K
```

If controlling the Outdoor Air Damper to a CFM setpoint, this screen allows you to set the design Minimum and Maximum required Outdoor Airflow CFM values for the Air Handler. The OA Max CFM limits the damper operation during CO₂ override conditions. K = 1000

Description	Minimum	Default	Maximum
OA Minimum CFM	0.10 K	.10 K	200 K
OA Maximum CFM	0.10 K	.10 K	200 K

Setpoint Screen #20 - Outdoor Air CFM Deadband

```
VCM-X Spts ID 59
OA CFM CONTROL
OA CFM DB...: 10CFM
```

This is the deadband above and below the OA CFM Control Setpoint which helps prevent hunting.

Description	Minimum	Default	Maximum
OA CFM Deadband	0 CFM	10 CFM	20,000 CFM

Setpoint Screen #21 - Economizer Maximum Position if High CO₂ Level

```
VCM-X Spts ID 59
Maximum Economizer
Position if High CO2
Level Occurs.: 100%
```

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

Description	Minimum	Default	Maximum
Maximum Economizer Position If High CO₂ Level Occurs	Economizer Minimum Position	100%	100%

VCM-X Setpoint Screens

Setpoint Screen #22 - CO₂ Protection Limit

```
VCM-X Spts ID 59
CO2 Protection Limit
Max Level.: 900 PPM
Reset Rnge: 100 PPM
```

When the CO₂ level rises above the CO₂ Protection Limit Max Level, the Economizer's Minimum Position will begin to reset open proportionally between the CO₂ Protection Limit Max Level Setpoint and the Reset Range Setpoint. The Reset Range value is added to the Max Level value. If the CO₂ levels are equal to or above the Max Level plus the Reset Range, the Economizer will be opened to its Maximum Economizer Position if high CO₂ levels occur.

Description	Minimum	Default	Maximum
CO ₂ Protection Limit Max Level	0 PPM	900 PPM	3000 PPM
CO ₂ Protection Limit Reset Range	0 PPM	100 PPM	1500 PPM

Setpoint Screen #23 - Static Setpoint, Deadband & Control Rate

```
VCM-X Spts ID 59
Static Spt...: 0.50"
Deadband.....: 0.10"
Control Rate.: 10 s
```

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 the Static Pressure Setpoint. If the Duct Static Pressure is above the Static Setpoint plus the Deadband, the Static Pressure Output Signal will be reduced at every Control Rate interval. If the Static Pressure is below the Static Setpoint minus the Deadband, the Output signal will be increased at every Control Rate interval.

The Duct Static Pressure Control Output Signal is a non-configurable Direct Acting Signal (0-10 VDC). This can be used to directly connect to a Supply Fan VFD without any modifications.

When you are using a Bypass Damper Actuator to control the Duct Static Pressure, you must set up the Bypass Damper Actuator or the Bypass Damper so that it is Reverse Acting in operation. The Output Signal increases (closes Bypass Damper) if the Duct Static Pressure is below the Duct Static Pressure Setpoint by the Deadband amount and the Output Signal decreases (opens Bypass Damper) if the Static Pressure is above the Setpoint by the Deadband amount.

Description	Minimum	Default	Maximum
Static Spt	0.10" WG	0.50" WG	3.0" WG
Deadband	0.10" WG	0.10" WG	1.0" WG
Control Rate	1 Sec	10 Sec	30 Sec

Setpoint Screen #24 - Building Pressure

```
VCM-X Spts ID 59
Building Pressure
Setpoint....: 0.10"
Deadband....: 0.02"
```

Direct Acting Control

If an Exhaust Fan Relay is configured, when the Building Static Pressure rises above the Building Pressure Setpoint plus the Deadband, the Exhaust Fan Relay will activate. It will remain on until the Building Pressure falls below the Building Pressure Setpoint minus the Deadband. If Modulating Building Pressure is configured, when the Building Static Pressure rises above the Building Pressure Setpoint plus the Deadband, the Building Pressure Output Signal will increase until the Building Static Pressure falls within the Deadband. If the Building Static Pressure falls below the Building Pressure Setpoint minus the Deadband, the Building Pressure Output Signal will decrease until the Building Static Pressure rises within the Deadband. The Building Pressure Output Signal is configurable for 0-10 or 2-10 VDC. For more detailed operation information, see the *VCM-X Controller Technical Guide* for the complete Building Pressure Control Sequence of Operation.

Reverse Acting Control

The Building Pressure Output Signal remains a Direct Acting 0-10 or 2-10 VDC signal, but the logic is reversed. On a drop in Building Static Pressure below the Building Pressure Setpoint minus the Deadband, the Building Pressure Output Signal will increase.

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

Setpoint Screen #25 - RAB Damper Factor

```
VCM-X Spts ID 59
Return Air Bypass
Damper Factor
Setpoint...: 40%
```

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.

VCM-X Setpoint Screens

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

Description	Minimum	Default	Maximum
Return Air Bypass Damper Factor	0%	40%	100%

Setpoint Screen #26 - Supply Fan Starting Delay Timer

VCM-X Spts ID 59
Fan Starting Delay
Timer...: 255 s

This is the Supply Fan Starting Delay Timer initiated whenever the VCM-X initiates Supply Fan operation. This is useful when you are using multiple VCM-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 VCM-X should be set with staggered Fan Starting Delay Timer Setpoint values. When the 255 Second default setpoint is used, it multiplies each VCM-X controller's address by 5 and uses this value in seconds as the Fan Starting Delay Time. This provides a staggered start for each VCM-X controller on the system without having to individually set each VCM-X controller for its own time delay.

Description	Minimum	Default	Maximum
Fan Start Delay Timer	0 Sec	255 Sec	255 Sec

Setpoint Screen #27 - Mechanical Heat/Cool Failure Time Period

VCM-X Spts ID 59
Mechanical Heat/Cool
Failures Occur After
No Change For 15 Min

When Heating or Cooling Mode is initiated and staging is activated, if the Supply Air Temperature does not rise or fall 5°F within the Mechanical Heat/Cool Failures Occur After No Change For Setpoint 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.

Description	Minimum	Default	Maximum
Mechanical Heat/Cool Failures Occur After No Change For	0 Min	15 Min	255 Min

Setpoint Screen #28 - Preheat/Low Ambient Temperature

VCM-X Spts ID 59
Preheat/Low
Ambient Temperature
Setpoint: 0°F

For cold climates where freezing temperatures may be experienced, a Pre-Heater relay output can be activated based on the Outdoor Air Temperature to prevent freezing of Water Coils. One of the VCM-X Relay Outputs must be configured for the Pre-Heater control. When configured, if the Outdoor Air Temperature falls below the Low OAT Ambient Protection Temperature Setpoint and the HVAC unit is in Occupied Mode, the Pre-Heater relay will activate.

Description	Minimum	Default	Maximum
Preheat/Low Ambient Temperature	0°F	0°F	70°F

Setpoint Screen #29 - Max OA Damper Tempering Limit

VCM-X Spts ID 59
Max OA Damper
Tempering Limit
Setpoint: 50%

The Maximum OA Damper Tempering Limit Setpoint allows you to set the maximum damper position the economizer can open to while the heat is running during the VAV Supply Air tempering mode in this sequence (to prevent potential wasting of energy).

Description	Minimum	Default	Maximum
Maximum Outdoor Air Damper Tempering Limit	0%	50%	60%

Setpoint Screen #30 - HVAC Schedule

VCM-X Spts ID 59
HVAC Schedule...: 0
[0 = Internal]
[1-5 = External]

The VCM-X has an Internal Scheduler. If you want the VCM-X to use its own Internal Schedule to schedule the HVAC unit, enter <0> for Internal. To use the External Schedule option, you must have a GPC Plus controller installed and operating on your system. To use one of the (5) External Schedules available on the GPC Plus controller, enter the number of the GPC Plus Schedule (1 through 5) you wish to use.

Description	Minimum	Default	Maximum
HVAC Schedule	0	0	5

VCM-X Setpoint Screens

Setpoint Screen #31 - Push-Button Override Duration

VCM-X Spts ID 59
Push-Button Override
Duration....: 2.0 Hr

If the VCM-X has a Space Temperature Sensor installed and it has the Override Button option, the HVAC unit will initiate Occupied Mode any time the Override Button is pressed and held for less than 3 seconds. 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.

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

Setpoint Screen #32 - HVAC Mode Sensor Slide Offset

VCM-X Spts ID 59
HVAC Mode Sensor
Slide Offset: 0°F

If the VCM-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.

Description	Minimum	Default	Maximum
HVAC Mode Sensor Slide Offset	0°F	0°F	10°F

Setpoint Screen #33 - Heat Pump Auxiliary Heating Delay

VCM-X Spts ID 59
Heat Pump
Auxiliary Heating
Delay: 3 Min

If your VCM-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.

Description	Minimum	Default	Maximum
Heat Pump Auxiliary Heating Delay	0 Min	3 Min	30 Min

Setpoint Screen #34 - Heat Pump Defrost Setpoints

VCMX-M Spts ID 102
Heat Pump Defrost
Defrost Tmp: 30°F
Defrost Tmr: 30 Min

The Defrost Temp Setpoint is the Coil Suction Temperature at which the unit will go into Defrost Mode during Heat Pump Heating operation. This unit will operate in the Defrost Mode for 10 minutes or until the Head Pressure reaches 450 PSI. The Defrost Timer determines the length of time between Defrost Modes. The length of the Defrost Timer can be automatically be adjusted by the Adaptive Defrost Adjustment described in Setpoint Screen # 35. This Defrost Mode is only available if using the VCM-X Modular Controller and a Head Pressure Module. A Suction Pressure Transducer is also required. This screen only applies if using the VCM-X Modular Controller with a Suction Pressure Sensor, a Head Pressure Module, and Head Pressure Transducer(s). This screen does not apply if using the VCM-X WSHP Controller and a WSHP Protection Module.

Description	Minimum	Default	Maximum
Heat Pump Defrost Temp	0°F	30°F	50°F
Heat Pump Defrost Timer	10 Min	30 Min	90 Min

Setpoint Screen #35 - Adaptive Defrost Adj. Setpoint

VCMX-M Spts ID 102
Adaptive Defrost
Adj. Setpoint: 0 MIN

Once initiated, the Defrost Mode is active until the Head Pressure reaches 450 PSIG 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 Timer (Screen #34). This adjustment value will be subtracted from the Heat Pump Defrost Timer if the Defrost Mode lasts the entire 10 minutes. A proportion of this adjustment value will be added to the Heat Pump Defrost Timer if the Defrost Mode only lasts between 8 minutes and 0 minutes. This screen only applies if using the VCM-X Modular Controller with a Suction Pressure Sensor, a Head Pressure Module, and Head Pressure Transducer(s). This screen does not apply if using the VCM-X WSHP Controller and a WSHP Protection Module.

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

Setpoint Screen #36 - Heat Wheel Defrost

VCM-X Spts ID 59
Heat Wheel Defrost
Setpoint: 30°F

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

Description	Minimum	Default	Maximum
Heat Wheel Defrost	0°F	30°F	50°F

Setpoint Screen #37 - Internal Schedule
Optimal Start Soak Multiplier

VCM-X Spts ID 59
Internal Schedule
Optimal Start Soak
Multiplier: 0.0

The Internal Schedule Optimal Start Soak Multiplier Setpoint is a multiplier that if set to a number greater than 0 will be used as a multiplier for calculating the Optimal Start Time for the HVAC unit. This multiplier is only applied if the unit has been off for more than 24 hours. See the *VCM-X Controller Technical Guide* for more detailed information regarding the Optimal Start. This multiplier is only applied if you are using the VCM-X Internal Schedule.

Description	Minimum	Default	Maximum
Internal Schedule Optimal Start Soak Multiplier	0.0	0.0	5.0

Setpoint Screen #38 - Trend Log Interval

VCM-X Spts ID 59
Trend Log
Interval: 15 MIN

An internal Trend Log is constantly updated at a rate equal to this value.

Description	Minimum	Default	Maximum
Trend Log Interval	1 Min	15 Min	60 Min

Setpoint Screen #39 - Sensor Calibration for

SPC & SAT

VCM-X Spts ID 59
Sensor Calibration
SPC: XX.X° 0.00°
SAT: XX.X° 0.00°

If the Space or Supply Air Temperature Sensors are reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature. Enter a positive Sensor Calibration value to raise the Space Temperature and/or Supply Air Temperature Sensor reading and a negative value to lower the Sensor reading.

Description	Minimum	Default	Maximum
Sensor Calibration SPC	-100.0°F	0.0°F	+100.0°F
Sensor Calibration SAT	-100.0°F	0.0°F	+100.0°F

Setpoint Screen #40 - Sensor Calibration for
RAT & OAT

VCM-X Spts ID 59
Sensor Calibration
RAT: XX.X° 0.00°
OAT: XX.X° 0.00°

If the Return Air or Outdoor Air Temperature Sensors are reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature. Enter a positive Sensor Calibration value to raise the Return Air Temperature and/or Outdoor Air Temperature Sensor reading and a negative value to lower the Sensor reading.

Description	Minimum	Default	Maximum
Sensor Calibration RAT	-100.0°F	0.0°F	+100.0°F
Sensor Calibration OAT	-100.0°F	0.0°F	+100.0°F

Setpoint Screen #41 - Sensor Calibration for
COIL

VCM-X Spts ID 59
Sensor Calibration
COIL: XX.X° 0.00°

If the Coil Temperature reading is too high, enter a negative calibration offset to decrease the reading. If it is too low, enter a positive value to increase the reading.

Description	Minimum	Default	Maximum
Sensor Calibration COIL	-30.0°F	0.0°F	+30.0°F

Scheduling

You can access the VCM-X controller Scheduling Screens by *pressing* <Schedule> on either the System Manager or the Modular Service Tool. *Press* the number button for the scheduling function you wish to view.

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

Week Schedules

Event #1

```
VCM-X Schd ID 59
Sunday   Event #1
Start Time...: XXXX
Stop Time...: XXXX
```

Event #2

```
VCM-X Schd ID 59
Sunday   Event #2
Start Time...: XXXX
Stop Time...: XXXX
```

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

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

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

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

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

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

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

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

Holiday Start/Stop Day Selection

```
VCM-X Hldy ID 59
Holiday # 1
Start Mon/Day.: XXXX
[ July 4th = 704 ]
```

```
VCM-X Hldy ID 59
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

```
VCM-X Hldy ID 59
Holiday Schedule
Start Event #1: XXXX
Stop Event #1: XXXX
```

```
VCM-X Hldy ID 59
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

```
VCM-X OvrD ID 59
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.

Setting Time & Date

Both the Modular Service Tool and Modular System Manager are equipped with a real time clock chip allowing them 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. The System Manager will also broadcast this information once every day at midnight to synchronize all of the controllers on the system.

Programming Times

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

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

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

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

```
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)

VCM-X Damper Force Modes

Programming the Date

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)

Daylight Savings

After you have programmed the date, the *Daylight Savings Time Auto Adjust Screen* will be displayed. If you want the time to be automatically adjusted for daylight savings time, use the arrow key to select Yes, or if not, use the arrow key to select No.

Daylight Savings Auto Adjustment: Yes
Use Left/Right Arrow

Note: The U.S. government has seen fit recently to arbitrarily determine the switch-over dates each year, so we recommend that you disable this function and manually change the schedules from year to year.

If you enable this operation, be aware that the time will change the first Sunday in April and then switch back the last Sunday in October. These used to be the standard dates that were constant from year to year.

Damper Force Modes

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

System Manager Instructions

To access the Damper Force Modes from the System Manager, *press* <Setpoints>. You will then see the *Unit ID Screen*. Enter the unit ID of the controller you wish to access and *press* <Enter>. The following screen will appear:

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

Press <3> on the keypad and then *press* <Enter>. You will then see the *Unit ID Screen*. Enter the unit ID of the controller you wish to access and *press* <Enter>. At this time the *Passcode Screen* will be displayed. Enter your level 2 passcode. *Press* <Enter> and the *Damper Force Modes Screen* will be displayed.

Modular Service Tool Instructions

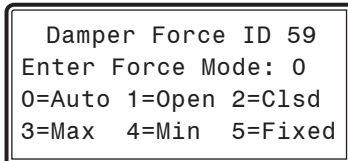
When using the Modular Service Tool, simply *press* the <Balance-Test> key. You will then see the *Unit ID Screen*. Enter the unit ID of the controller you wish to access and *press* <Enter>. The following screen will be displayed:

1) Outputs Force
2) Dampers Force
ESC) Exit Menu

Press <2> to access the *Dampers Force Mode Screen*.

Dampers Force Mode Screen

If the unit ID you entered is for a VCM-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 VCM-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.



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 46 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 46 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 47 for complete setpoint information.

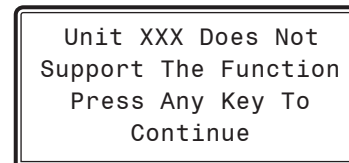
Caution: The Damper Force Modes should only be used by qualified service personnel. Serious damage to the ductwork could result if the dampers are all forced closed and the HVAC unit fan is operating.

Outputs Force

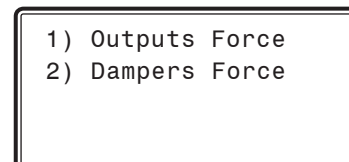
Outputs Force settings are available for testing or troubleshooting the system. These Force settings can only be accessed and programmed from the Modular Service Tool. The System Manager does not allow for programming of this function.

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

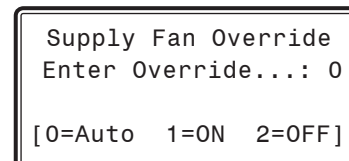
To access the Outputs Force settings, simply *press* the <Balance-Test> button on the Modular Service Tool. You will then see the *Unit ID Screen*. Enter the unit ID of the VCM-X controller you wish to access and *press* <Enter>. The Outputs Force settings are only available for the VCM-X controller. They are not supported for the VAV/Zone controllers or other Add-on controllers. If you enter a unit ID for any other type of unit except a VCM-X controller, the following screen will be displayed:



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



Press <1> to access the *Outputs Force Screen*.



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

VCM-X Outputs Force

The next screen displays the Relay Overrides for Relay 2. After *pressing* <Enter>, the next relay will be displayed. All 20 *Relay Override Screens* (including the AHU fan relay) are available by *pressing* <Enter> after each setting is made.

```
Relay Overrides
Relay 2 Override: 0

[0=Auto  1=ON  2=OFF]
```

After the screen for relay 21 is displayed, the first *Analog Output Override Screen* will be displayed.

Analog Output 1 Screen

```
Economizer Overrides
Analog Output #1
Override Volts: -1.0
[-1.0=Auto]
```

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

Analog Output 2 Screen

```
Supply VFD Override
Analog Output #2
Override Volts: -1.0
[-1.0=Auto]
```

Analog Output 3 Screen

```
Exhaust VFD Override
Analog Output #3
Override Volts: -1.0
[-1.0=Auto]
```

Analog Output 4 Screen

```
Mod Heating Override
Analog Output #4
Override Volts: -1.0
[-1.0=Auto]
```

Analog Output 5 Screen

```
Mod Cooling Override
Analog Output #5
Override Volts: -1.0
[-1.0=Auto]
```

Analog Output 6 Screen

```
RA Damper Override
Analog Output #6
Override Volts: -1.0
[-1.0=Auto]
```

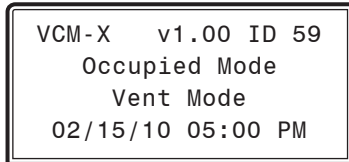
Analog Output 7 Screen

```
RA Bypass Override
Analog Output #7
Override Volts: -1.0
[-1.0=Auto]
```

Status

The VCM-X controller Status Screens are accessed by *pressing* the <Status> button on either the System Manager or the Modular Service Tool. Following are the available status screens and a description of their functions:

Status Screen 1 - Mode



- Line 2 Displays one of the following:**
- | | |
|----------------------|----------------------|
| Unoccupied Mode | Remote FRC Occupied |
| Occupied Mode | Override Mode |
| Holiday Mode | Zone Demand! |
| Forced Schedule Mode | OUTPUT FORCE MODE! |
| SUPPLY AIR CUTOFF! | High CO2 Level Mode! |

Line 3 If you selected Supply Air as the controlling sensor, this line will display:

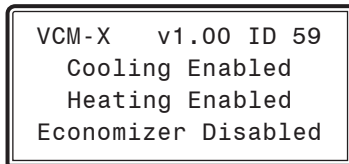
Supply Air Control

If you select Space Temp or Return Air Control, the display will show one of the following:

- | | | |
|-----------|--------------------|--------------|
| Off Mode | Dehumid. Mode | Defrost Mode |
| Vent Mode | Cool Dehumid. Mode | |
| Cool Mode | Heat Dehumid. Mode | |
| Heat Mode | Warm Up Mode | |

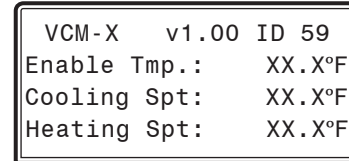
- Line 4 Displays one of the following:**
- MM/DD/YY HH:MM XX (XX = AM or PM)
 Fan Starting Delay and then time will display
 xx Left in WarmUp (Number of Minutes Left)

Status Screen 2 - Cooling, Heating, Economizer



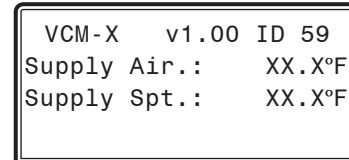
- Line 2 Displays one of the following:**
- Cooling Enabled
 Cooling Disabled
- Line 3 Displays one of the following:**
- Heating Enabled
 Heating Disabled
- Line 4 Displays one of the following:**
- Economizer Enabled
 Economizer Disabled

Status Screen 3 - Mode Enable Temperature & Mode Cooling and Heating Setpoints



- Line 2 Mode Enable Temperature**
 Can be the Supply Air Temperature, Return Air Temperature, Outdoor Air Temperature, or Space Temperature, depending on which one has been configured as the Mode Enable Sensor.
- Line 3 Cooling Mode Setpoint**
 Based on the current Occupied/Unoccupied Mode of operation.
- Line 4 Heating Mode Setpoint**
 Based on the current Occupied/Unoccupied Mode of operation.

Status Screen 4 - Supply Air Temperature & Setpoint



- Line 2 Current Supply Air Temperature**
 The Supply Air Temperature is always required. If a Supply Air Temperature Sensor is not installed, the VCM controller will not operate correctly and will display 0°F.
- Line 3 Current Active Supply Air Setpoint**
 This is the Supply Air Setpoint for the mode that the unit is currently operating in. If the Supply Air Reset is configured, this is the calculated setpoint based on the current Reset Source conditions.

VCM-X Status Screens

Status Screen 5 - Space Temp, Return Air & Slide Adjust

```
VCM-X v1.00 ID 59
Space Tmp.: XX.X°F
Return Air.: XX.X°F
Slide Adj.: XX.X°F
```

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.

Line 3 Return Air Temperature

This sensor is optional. 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.

Status Screen 6 - Leaving Water Temperature A

```
VCMX-HP v1.00 ID 102
Leaving Water
Temp A: 0.0°F
```

Line 2-3 Leaving Water Temperature A

If this is a Water Source Heat Pump Unit, this screen will appear and display the Leaving Water Temperature of the unit. If this unit has two leaving water temperature sensors, this is the Leaving Water Temperature of System A.

Status Screen 7 - Leaving Water Temperature B

```
VCMX-HP v1.00 ID 102
Leaving Water
Temp B: 0.0°F
```

Line 2-3 Leaving Water Temperature B

If this is a Water Source Heat Pump Unit with two leaving water temperature sensors, this screen will display the Leaving Water Temperature of System B.

Status Screen 8 - Coil Temp & Setpoint

```
VCM-X v1.00 ID 59
Coil Tmp...: XX.X°F
Coil Tmp Spt: XX.X°F
```

Line 2 Coil Temperature or Lowest Coil

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

If this unit has multiple digital scroll compressors and has a Full Digital Module or Dual Digital Module installed, this line will display Lowest Coil and will display the lowest of the multiple suction temperatures. The coil temperatures of all the coils will be displayed on Status Screens 19 & 20.

Line 3 Coil Temperature Setpoint

During dehumidification, the Coil Suction Temperature Setpoint is automatically reset based on the current space humidity conditions. This is the current calculated Coil Temperature Setpoint based on that reset.

Status Screen 9 - Outdoor Air Temperature & Outdoor Air Relative Humidity

```
VCM-X v1.00 ID 59
Outdoor Tmp: XX.X°F
Outdoor RH.: XX.X%
```

Line 2 Current Outdoor Air Temperature

If an Outdoor Air Temperature Sensor has been installed and configured on the unit or if an Outdoor Air Broadcast has been configured on another VCM-X controller on the system, the Outdoor Air Temperature will appear on this line. If not, this line will display a temperature that is half way between the Cooling and Heating Lockout Setpoints.

Line 3 Current Outdoor Air Relative Humidity

If an Outdoor Humidity Sensor has been installed and configured on the VCM-X, the Outdoor Air Relative Humidity Percentage will appear on this line. If not, this line will display 0%.

Status Screen 10 - OA Dewpoint & Dewpoint Temp

```
VCM-X v1.00 ID 59
OA Dewpoint.: XX.X°F
Dewpoint Spt: XX.X°F
```

Line 2 Current Calculated Outdoor Air Dewpoint Temperature

If both an Outdoor Humidity Sensor and an Outdoor Air Temperature Sensor have 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.

Line 3 Current Outdoor Air Dewpoint Setpoint

The user adjustable Outdoor Air Dewpoint Temperature Setpoint will appear on this line.

Line 3 Current Static Pressure Output Signal Percentage

Indicates the output signal percentage being supplied to the VFD Controller 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 Config].

Line 4 Indicates That This is An Optional Output

This output may or may not have live data to display.

Status Screen 13 - Economizer %, OA Wetbulb, and CO₂ Level

```
VCM-X v1.00 ID 59
Economizer.: XXX %
OA Wetbulb.: XX.X°F
CO2 Level.: XXXXPPM
```

Line 2 Current Economizer Open Percentage

The Economizer is optional. This shows the Outdoor Air Damper open percentage. If Economizer Control is not configured, it will display 0%.

Line 3 Current Wetbulb/Drybulb Temperature

The Outdoor Air Wetbulb Temperature is optional. To display the Outdoor Air Wetbulb Temperature, you must install an Outdoor Air Temperature Sensor (or an Outdoor Air Temperature Broadcast) and an Outdoor Air Relative Humidity Sensor. If these conditions exist, this line will display the calculated Outdoor Air Wetbulb Temperature. If these conditions do not exist, it will display 0°F.

Line 4 Current CO₂ Level

The CO₂ Level is optional. You must install and configure a CO₂ Sensor to display the CO₂ Level. If a CO₂ Sensor is not installed and configured, this line will display 0 PPM.

Status Screen 11 - Indoor RH & Indoor RH Setpoint

```
VCM-X v1.00 ID 59
Indoor RH....: XXX%
Indoor RH Spt: XXX%
```

Line 2 Current Indoor Relative Humidity Percentage

If an Indoor Humidity Sensor has been installed and configured on the unit, the current Indoor Air Relative Humidity Percentage will appear on this line. The installed Indoor Humidity Sensor can be either a Wall Mounted type or a Return Air Mounted type. If an Indoor 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 14 - Outdoor Air CFM

```
VCM-X v1.00 ID 59
OA CFM: 0.00 K
OA Sp.: 0.00 K
[Optional Input]
```

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 Outdoor Air Setpoint

If control of the OA Damper based on CFM is configured, this is the controlling setpoint. K = 1000

Line 4 Indicates That This is An Optional Input

This input may or may not have live data to display.

Status Screen 12 - Static Pressure & Output %

```
VCM-X v1.00 ID 59
Static Pr...: X.XX"
Press Output: XXX%
[Optional Output]
```

Line 2 Current 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".

VCM-X Status Screens

Status Screen 15 - Supply Air & Return Air CFM

```
VCM-X v1.00 ID 59
SA CFM: 0.00 K
RA CFM: 0.00 K
[Optional Inputs]
```

Line 2 Supply Air CFM

If a supply air airflow monitoring station is being used, this is the current CFM reading of that device. K = 1000

Line 3 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 4 Indicates That These are Optional Inputs

These inputs may or may not have live data to display.

Status Screen 16 - Building Pressure & Output %

```
VCM-X v1.00 ID 59
Building Pr..: X.XX"
Press Output: XXX%
[ Optional Outputs ]
```

Line 2 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 3 Current Building Pressure Output Signal Percentage

Indicates the output signal percentage being supplied to the Exhaust Fan VFD controller or Exhaust Damper Actuator when you have configured one of these options for your HVAC unit.

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

Line 4 Indicates That These Are Optional Outputs

This output may or may not have live data to display.

Status Screen 17 - MODGAS Output % & MHGRV Output %

```
VCM-X v1.00 ID 59
MODGAS Pos..: XXX%
MHGRV Pos...: XXX%
[Optional Equipment]
```

Line 2 Current MODGAS Heating Output Signal

Indicates the percentage of the output signal being supplied to the MODGAS controller when you have one connected to your HVAC unit. If you do not have a MODGAS controller connected to your VCM-X controller, this screen will indicate [MODGAS NOT CONNECTED].

Line 3 Current MHGRV Reheat Valve Output Signal Percentage

Indicates the percentage of the output signal being supplied to the MHGRV controller when you have one connected to your VCM-X controller. If you do not have a MHGRV controller connected to your VCM-X controller, this screen will indicate [MHGRV NOT CONNECTED].

Line 4 Optional Equipment

Indicates that these outputs are optional and therefore may or may not have live data to display.

Status Screen 18 - Mod Heating & Cooling %

```
VCM-X v1.00 ID 59
Mod Heating: XXX%
Mod Cooling: XXX%
[ Optional Outputs ]
```

Line 2 Current Modulating Heating Output Signal Percentage

Indicates the percentage of the output signal being supplied to a Modulating Heating device when you have configured this option for your HVAC unit. If Reverse Acting operation is configured, this percentage will be Reversed. See the following examples for clarification:

Standard Operation:

0-10 VDC 0% = 0 VDC 100% = 10 VDC

2-10 VDC 0% = 2 VDC 100% = 10 VDC

Reverse Acting Operation:

0-10 VDC 0% = 10 VDC 100% = 0 VDC

2-10 VDC 0% = 10 VDC 100% = 2 VDC

If you do not have a Modulating Heating device configured, this screen will indicate [No Mod Heat Cnfg].

Line 3 Current Modulating Cooling Output Signal Percentage
 Indicates the percentage of the output signal being supplied to a Modulating Cooling device when you have configured this option for your HVAC unit. If reverse acting is configured, this percentage will be reversed. See the following examples for clarification:

Standard Operation:

0-10 VDC 0% = 0 VDC 100% = 10 VDC
2-10 VDC 0% = 2 VDC 100% = 10 VDC
1.5-5.0 VDC 0% = 1.5 VDC 100% = 5.0 VDC

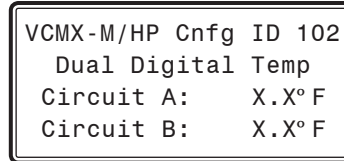
Reverse Acting Operation:

0-10 VDC 0% = 10 VDC 100% = 0 VDC
2-10 VDC 0% = 10 VDC 100% = 2 VDC

If you do not have a Modulating Cooling device connected to your HVAC unit and configured, this screen will indicate [No Mod Cool Config].

If this unit has a Dual Digital Module, Full Digital Module, or Water Source Heat Pump with multiple Digital Scroll Compressors, this line will be blank.

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

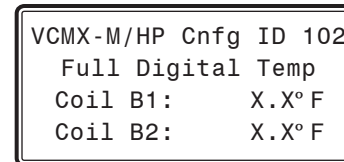


Line 2 Dual Digital Temperature
 If using a VCM-X Modular Controller (OE332-23-VCMX-MOD-C) with a Dual Digital Module (OE370-23-DD) or if you are using the VCM-X WSHP Controller (VCMX-23-VCMX-WSHP-C) with two Digital Scroll Compressors, this screen will appear.

Line 3 Circuit A Temperature
 This is the current Coil Suction Temperature of Circuit A.

Line 4 Circuit B Temperature
 This is the current Coil Suction Temperature of Circuit B.

Status Screen 20 - Full Digital Module

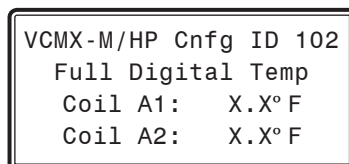


Line 2 Full Digital Temperature
 If using a VCM-X Modular Controller (OE332-23-VCMX-MOD-A) with a Full Digital Module (OE370-23-FD-A) or if you are using the VCM-X WSHP Controller (VCMX-23-VCMX-WSHP-A) with at least two Digital Scroll Compressors, this screen will appear. Values will show zero if not using 4 Digital Scroll Compressors.

Line 3 Coil B1 Temperature
 This is the current Coil Suction Temperature of Compressor B1.

Line 4 Coil B2 Temperature
 This is the current Coil Suction Temperature of Compressor B2.

Status Screen 19 - Full Digital Module OR Dual Digital Module



Line 2 Full Digital Temperature
 If using a VCM-X Modular Controller (OE332-23-VCMX-MOD-A) with a Full Digital Module (OE370-23-FD-A) or if you are using the VCM-X WSHP Controller (VCMX-23-VCMX-WSHP-A) with multiple Digital Scroll Compressors, this screen will appear.

Line 3 Coil A1 Temperature
 This is the current Coil Suction Temperature of Compressor A1.

Line 4 Coil A2 Temperature
 This is the current Coil Suction Temperature of Compressor A2.

VCM-X Status Screens

Status Screen 21 - Full Digital Signal OR Dual Digital Signal

```
VCMX-M/HP Cnfg ID 102
Full Digital
Stage 1 Sig: 0%
Stage 2 Sig: 0%
```

Line 2 Full Digital Signal

If using a VCM-X Modular Controller (OE332-23-VCMX-MOD-A) with a Full Digital Module (OE370-23-FD-A) or if you are using the VCM-X WSHP Controller (VCMX-23-VCMX-WSHP-A) with at least two Digital Scroll Compressors, this screen will appear.

Line 3 Stage 1 Signal Percentage

This is the modulating signal percentage for Compressor 1 (A1) if there are two Digital Scroll Compressors, or for Compressors 1 (A1) and 3 (B1) if there are four Digital Scroll Compressors.

Line 4 Stage 2 Signal Percentage

This is the modulating signal percentage for Compressor 2 (A2) if there are two Digital Scroll Compressors, or for Compressors 2 (A2) and 4 (B2) if there are four Digital Scroll Compressors.

```
VCMX-M/HP Cnfg ID 102
Dual Digital
Comp A Sig: 0%
Comp B Sig: 0%
```

Line 2 Dual Digital Signal

If using a VCM-X Modular Controller (OE332-23-VCMX-MOD-C) with a Dual Digital Module (OE370-23-DD) or if you are using the VCM-X WSHP Controller (VCMX-23-VCMX-WSHP-C) with two Digital Scroll Compressors, this screen will appear.

Line 3 Compressor A Signal

This is the modulating signal percentage for Circuit A Compressor 1 (A1).

Line 4 Compressor B Signal

This is the modulating signal percentage for Circuit B Compressor 1 (B1).

Status Screen 22 - Head Pressure Setpoint

```
VCMX-M/HP Cnfg ID 102
Current
Head Pr Spt: 0 PSI
```

Line 2-3 Current Head Pressure Cooling or Reheat Setpoint

If you are using the VCM-X Modular or WSHP Controller and have a One Condenser or Two Condenser Head Pressure Module attached to the unit, the Head Pressure Cooling or Reheat Setpoint will display, depending on what mode the Module is in. This status value will show 0 if not in the Cooling or Dehumidification Mode.

Status Screen 23 - Head Pressure Condenser Fan #1

```
VCMX-M/HP Cnfg ID 102
Cond. Fan Sect. #1
Head Pr . . . . : 0PSI
Cond Fan Spd: 0%
```

Line 2 Condenser Fan #1

If you are using the VCM-X Modular or WSHP Controller and have a One Condenser or Two Condenser Head Pressure Module attached to the unit, this line displays Condenser Fan #1.

Line 3 Head Pressure

This line indicates the highest of up to 4 current Head Pressure readings on a One Condenser Head Pressure Module. If using a Two Condenser Head Pressure Module, this line indicates the highest of the first 2 current Head Pressure readings on that module.

Line 4 Condenser Fan Speed

This line displays the speed of the associated Condenser Fan (0-100%) that is currently necessary to maintain the Head Pressure Setpoint.

Status Screen 24 - Head Pressure Condenser Fan #2

```
VCMX-M/HP Cnfg ID 102
Cond. Fan Sect. #2
Head Pr . . . . : 0PSI
Cond Fan Spd: 0%
```

Line 2 Condenser Fan #2

If you are using the VCM-X Modular or WSHP Controller and have a Two Condenser Head Pressure Module attached to the unit, this line displays Condenser Fan #2.

Line 3 Head Pressure

This line indicates the highest of the second two Head Pressure readings of the Two Condenser Head Pressure Module.

Line 4 Condenser Fan Speed

This line displays the speed of the associated Condenser Fan (0-100%) that is currently necessary to maintain the Head Pressure Setpoint.

Status Screen 25 - Return Air Damper Signal & Bypass Damper Signal

```
VCM-X v1.00 ID 59
Return Dmp..: XXX%
Bypass Dmp..: XXX%
[Optional Outputs]
```

Line 2 Current Return Air Damper Signal

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 Cnfg] 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 Cnfg] will be displayed instead.

Line 4 Indicates That These Are Optional Outputs

This output may or may not have live data to display.

Status Screens 26-32 - Supply Fan Relay

```
VCM-X v1.00 ID 59
Fan Relay: OFF
Cool Stage 1: OFF
Heat Stage 1: OFF
```

Line 2 Current Supply Fan Relay Status

The letters FRC will appear before the colon if this Relay is in a Force Mode. On screens 24 to 30, this line will indicate the relays use and the ON/OFF condition for that relay. Possible options are as follows:

- | | |
|-------------------------|------------------------|
| Not Used | Pre-Heater |
| Heat Stage | Alarm Relay |
| Cool Stage | Override |
| Warmup Mode | Occupied |
| Rev Valve | Economizer (OA Damper) |
| Gas Re-Heat (HGR Relay) | Heat Wheel |
| Exhaust Fan | Emergency Heat |

Line 3 Current relay status and description of what it is configured for

The letters FRC will indicate the relay is forced to its current condition.

Line 4 Current relay status and description of what it is configured for

The letters FRC will indicate the relay is forced to its current condition.

Status Screen 33 - Alarm Conditions

```
VCM-X v1.00 ID 59

NO ALARMS
```

Line 2 Blank

Line 3 Alarm Conditions

Can be one of the following:

- NO SUPPLY AIR TEMP
- NO OUTDOOR AIR TEMP
- SPACE SENSOR FAILURE
- MECH COOLING FAILURE
- MECH HEATING FAILURE
- FAN PROVING ALARM
- DIRTY FILTER ALARM
- EMERGENCY SHUTDOWN
- LO SUPPLY AIR ALARM
- HI SUPPLY AIR ALARM
- LOW CONTROL TEMP
- HIGH CONTROL TEMP
- MODULE ALARM

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

VAV/Zone Configuration Screens

VAV Zone Configuration

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

System Manager Instructions

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

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

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

Modular Service Tool Instructions

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

Configuration Screen #1 - Box Configuration

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

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

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

Configuration Screen #2 - Damper Operation

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

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

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

Configuration Screen #3 - Voting Zone

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

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

Configuration Screen #4 - Pressure Independent Airflow Constant

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

If this is a Pressure Independent Box, you must enter this airflow constant so that the CFM readings can be correctly calculated. This airflow constant is provided by the box manufacturer and depends on the diameter of the duct.

VAV/Zone Configuration Screens

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
[0 = 0-10   1 = 2-10]
    
```

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

Configuration Screen #7 - Box Heat Allow

```

XX Box Cnfg  IDXXXX
Allow Box Heat With
HVAC Heat....: NO
[0=NO   1=YES]
    
```

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

Configuration Screen #8 - Main Fan Status

```

XX Box Cnfg  IDXXXX
This Unit Needs Main
Fan Status...: NO
[0=NO   1=YES]
    
```

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

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 #.

Configuration Screen #10 - Dump Zone

```

XX Box Cnfg  IDXXXX
Is This A Dump Zone
(No Actuator): NO
[0=NO   1=YES]
    
```

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

Configuration Screen #11 - HVAC Unit is on Separate Loop

```

XX Box Cnfg  IDXXXX
HVAC Unit is on
Separate Loop: NO
[0=NO   1=YES]
    
```

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

VAV/Zone Setpoint Screens

VAV/Zone Controller Setpoints

Setpoint Screen #1 - Occupied Setpoints

```

XX Box Spts IDXXXX
Occupied Setpoints
Cooling.....: XX°F
Heating.....: XX°F
    
```

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	50°F	74°F	90°F
Heating Setpoint	50°F	70°F	90°F

Setpoint Screen #2 - Unoccupied Setbacks

```

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

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	0°F	+10°F	+30°F
Heating SetBk	0°F	-10°F	-30°F

Setpoint Screen #3 - AHU Heat Call Space Temp

```

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

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	50°F	70°F	90°F

Setpoint Screen #4 - Auxiliary Heat Setpoint

```

XX Box Spts IDXXXX
Auxiliary Heat
Setpoint...: XX°F
    
```

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	50°F	70°F	90°F

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

VAV/Zone Setpoint Screens

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

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

VAV/Zone Setpoint Screens

Setpoint Screen #11 - SAT HVAC Mode Deadband

```
XX Box Spts IDXXXX
SAT HVAC Mode
Deadband.: XX°F
```

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 2°F 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 2°F below the space temperature.

Description	Minimum	Default	Maximum
SAT HVAC Mode Deadband	0°F	10°F	20°F

Setpoint Screen #12 - Zone Alarm Offsets

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

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	+1°F	+30°F	+50°F
Lo Zone Alarm	-1°F	-30°F	-50°F

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
0=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 VCM-X controller. Enter <0> to operate on the AHU schedule. Enter <1-5> to use an external schedule. A GPC Plus is required for schedules 1-5.

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.: X°F
```

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	0°F	0°F	6°F

VAV/Zone Setpoint Screens

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...: XX°F
    
```

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	0°F	0°F	30°F

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

```

Sensor Calibration
SPC:  XXX.X°  XXX.X°
SAT:  XXX.X°  XXX.X°
[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)	-100°F	0°F	+100°F
SAT (Supply Air)	-100°F	0°F	+100°F

VAV/Zone Status Screens

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.X°F
Cooling Spt: XX.X°F
Heating Spt: XX.X°F
```

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: XX°F
H/C Demand.: XX.X°F
```

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.X°F
Box Air.: XX.X°F
```

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

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

Line 4 **Blank**

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

```

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

- Line 2** Current Zone Damper Position
If you entered a FORCE command, the letters FRC will appear. If this is normal damper operation, the FRC will not be displayed.
- Line 3** If this is a Pressure Independent box, the current Airflow will be displayed. If not, this line will display the desired damper position.
- Line 4** If this is a Pressure Independent box, this line will display the Desired CFM the box would like to provide to the zone. If not, this line will display [Controls to +/- 3%] to indicate how accurately the damper will maintain the desired position.

Status Screen #6 - Fan Status & Reheat Stages

```

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

- Line 2** If this is a Fan Powered box, this line will display the Fan On/Off Status. On non-fan powered boxes, this line will display [Exp Relay 1 Not Used].
- Line 3** If your VAV/Zone Controller has been configured to control reheat stages, this line reflects the On/Off Status of the first stage of Reheat. If you have 3 stages of reheat, this line will display the total number of active heating stages.

Examples:

“1 Reheat Stages On” or

“2 Reheat Stages On” or

“3 Reheat Stages On”

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

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

Status Screen #7 - Alarm Status

```

XX Box v1.04 IDXXXX

NO ALARMS!
    
```

- Line 2** Blank

- Line 3** NO ALARMS!

This is displayed if no alarms are detected. If there are one or more alarms active, the possible messages are shown below:

- SPACE SENSOR FAILURE
- CFM SENSOR FAILURE
- DAMPER OPENING ALARM
- DAMPER CLOSING ALARM
- HI SPACE TEMP ALARM
- LO SPACE TEMP ALARM
- DPR FEEDBACK FAILURE

- Line 4** Blank

VAV/Zone Damper Force Modes

Damper Force Modes

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

System Manager Instructions

To access the Damper Force Modes from the System Manager, *press* the <Setpoints> button. You will then see the *Unit ID Screen*. Enter the unit ID of the controller you wish to access and *press* <Enter>. The following screen will appear:

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

Press <3> on the keypad and then <Enter>. You will then see the *Unit ID Screen*. Enter the unit ID of the controller you wish to access and *press* <Enter>. At this time, the *Password Screen* will be displayed. Enter your level 2 password, *press* <Enter>, and the following screen will be displayed:

```
1) Outputs Force
2) Dampers Force
```

Press <2> to access the *Damper Force Modes Screen*. Please note: 1) Outputs Force is not available with the System Manager.

Modular Service Tool Instructions

When using the Modular Service Tool, simply *press* the <Balance-Test> button. You will then see the *Unit ID Screen*. Enter the unit ID of the controller you wish to access and *press* <Enter>. The following screen will be displayed:

```
1) Outputs Force
2) Dampers Force
```

Press <2> to access the *Dampers Force Modes Screen*. Please note: 1) Outputs Force is available with the Modular Service Tool, but is not used with the VAV/Zone controller.

Dampers Force Mode Screen

If the unit ID you entered is for a VCM-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 VCM-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 ID 59
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. The Force Modes for each of these settings is outlined below.

- | | |
|----------|--|
| 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 damper to its 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 the damper’s maximum airflow position set under <i>VAV/Zone Controller Setpoint Screen #5</i> (see page 46). |
| 4= Min | This setting will force the damper to the current mode’s minimum position setpoint. These modes are Vent Mode, Heat Mode, and Cool Mode. They may each have a different minimum depending on how you configured the setpoints. See <i>VAV/Zone Controller Setpoint Screen #5</i> on page 46. |
| 5=Fixed | This setting will force the damper to a fixed position based on the fixed position setpoint.

See <i>VAV/Zone Controller Setpoint Screen #8</i> on page 47 for available 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

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.

System Manager Instructions

From any *Menu Screen*, press the <Setpoints> button. The *Unit Selection Screen* will appear requesting that you enter the unit ID number. All MiniLink PDs are set at address 60. Enter the correct unit loop number for the loop the MiniLink Polling Device is connected to (Loop 1 you would enter 1) and then enter <60>. Press <Enter>. You will see the screen shown below.

```

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

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

Modular Service Tool Instructions

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

Configuration Screen #1 - System Type

```

Polling Unit Config
System Type
Selection: X
[0=Zoning 1=VAV]
    
```

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

```

Polling Unit Config
Optimal Start
Target Zone..: XXX
[Enter 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

```

Polling Unit Config
Maverick Testing
Disabled: YES
[0=NO 1=YES]
    
```

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

```

Polling Unit Config
Enable Alarm Polling
Unit XX : YES
[0=NO 1=YES]
    
```

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 Screens

MiniLink PD Status

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

```
Polling Device
System Occupied
Venting Mode
XXX Min Left in Mode
```

- 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

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

- 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.

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