VCM Controller
Operator Interface SD
Technical Guide

VCM Controller Code: SS1016
VAV/Zone Controller Code: SS1001, SS1005, SS1025
Requires Modular Service Tool SD Code: SS1063
Requires Modular System Manager SD Code: SS1064

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

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

Download instructions are found in Appendix B on page 63 of this manual.

**IMPORTANT NOTICE**

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

VCM-X & VCM-X E-BUS Controller - OR-VCMXRNEOISD-TGD
RNE Controller - OR-VCMXRNEOISD-TGD
SA E-BUS Controller - AA-SAOISD-TGD
VCB-X Controller - OR-VCBXOISD-TGD
VAV/CAV and MUA II Controllers - OR-VAVCAVMUAOISD-TGD
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The OE391-12 Modular Service Tool is a system operator interface that provides a direct link to enable the system operator to view the status, configure, and adjust the setpoints of the VAV/CAV, MUA II, VCM, VCM-X, VCM-X E-BUS, RNE, VCB-X, SA E-BUS or VAV/Zone Controller on the control system communications loop. However, this manual only applies to VCM and VAV/Zone Controllers. See note in the inside front cover for the list of manuals that pertain to other controllers.

The Modular Service Tool is housed in an attractive black plastic enclosure. The display area is covered with a clear plastic bezel for protection of the display screen. The Modular Service Tool has a 4-line-by-20-character display panel with adjustable contrast control and a 27-key membrane keypad for data selection and entry. All keypad operations are simple and straightforward, utilizing non-cryptic plain English language messages. Menu-driven programming allows for easy setup and operation without the need for specialized training. The Modular Service Tool is supplied with a programmable 4 Gigabyte SD memory card, with (4) AA 1.5 V batteries, a wall mount a DC power supply, a mini-Din communication cable, and an E-BUS communication cable. The mini-Din cable allows you to connect the Modular Service Tool to any Orion controller which has a mini-DIN connector socket for programming, monitoring, and troubleshooting purposes.

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

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

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

Be sure that the Modular Service Tool’s SD memory card is inserted correctly and that the Modular Service Tool has fresh batteries installed or that it is connected to a power source using the supplied power pack before attempting any programming of the controller. See Figure 2 for connection details.

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

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

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

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

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

**Power/Comm Board Wiring**

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**WARNING!**

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

---

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

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

---

**NOTE:**

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

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

**Stand Alone Connection**

**NOTE:** If desired a Power/Comm board as used with the networked system can be installed and wired instead of using the pigtail cable wiring shown below. See the networked system wiring diagram for details.

Use supplied modular cable with stripped ends for connection to terminal block and transformer.

- **WHITE (T)**
- **DRAIN WIRE (SHLD)**
- **BLACK (R)**
- **RED (24 VAC)**
- **BROWN (GND)**
- **GREEN (GND)**

**NOTE:** For stand-alone installations (no CommLink or MiniLink), all TERM jumpers must be ON. For all applications with CommLink(s) or MiniLink(s), all jumpers must be OFF.

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

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

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

Display Screens & Data Entry Keys

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

<table>
<thead>
<tr>
<th>Keypad Description</th>
<th>Key Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEXT</td>
<td>Use this key to access the Setup Screens</td>
</tr>
<tr>
<td>ESC</td>
<td>Use this key to exit from screens or from data entry or to return to the Main Screen from any screen in the system.</td>
</tr>
<tr>
<td>ENTER</td>
<td>Use this key to enter a new value.</td>
</tr>
<tr>
<td>Clear</td>
<td>If a data entry mistake is made, press this key to clear the data entry field and start over. This key also turns off the power to the Service Tool when on the Main Screen.</td>
</tr>
<tr>
<td>Minus</td>
<td>If a setpoint with a negative value is required, press this key for the minus sign.</td>
</tr>
<tr>
<td>DEC</td>
<td>Press this key when entering data that requires a decimal point.</td>
</tr>
<tr>
<td>← →</td>
<td>Use these keys to change values in the Configuration Screens as prompted.</td>
</tr>
<tr>
<td>↑ ↓</td>
<td>Use these keys to step backward or forward through the screens.</td>
</tr>
</tbody>
</table>

Mode Selection Buttons

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

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

Notes:

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

Table 2: Button Descriptions
Modular Service Tool Initialization

Modular Service Tool Initialization Screen and Setup Screens

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

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

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

Setting The Time & Date

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

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

Programming the Time

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

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

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

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)

Program Time/Date

Month (1-12): XX
Day (1-31): XX
Year (00-99): XX

Month - Enter the Month (1 to 12)
Day - Enter the Day of the Month (1 to 31)
Year - Enter the current Year with two digits (00 to 99)

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

1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
Setting the Operating Mode

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

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

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

The Communications Screen will appear as shown below.

Press <←> or <→> to select the proper mode of operation.

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

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

Modular Service Tool SD

Setting the Energy Saving Timer

The Modular Service Tool has a built-in timer that can be programmed to shut the Service Tool off after a specified period of time if no buttons are pressed. This is a very useful feature if you are powering the Service Tool from the internal batteries.

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

The Energy Saving Screen will appear as shown below:

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

The Setup Screen will appear again as shown below:
Modular Service Tool Alarm Search

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

To search for alarms, press <ALARMS> while on any screen but the Setup Screen(s). The Unit Selection Screen will be displayed.

```
Unit Selection
Enter Unit ID#
Selected ID#: XXXX
 *00*
```

Enter the Unit ID of the controller the Service Tool is connected to and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

NOTE: If the *00* remains, it indicates a communication failure to the controller.

One of the following screens will appear:

```
VCM V.XXX
NO ALARMS
```

```
VCM V.XXX
ALARMS PRESENT
SCROLL DOWN TO VIEW
```

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

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

Modular Service Tool Override Search

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

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

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

```
Unit Selection
Enter Unit ID#
Selected ID#: 160
 *00*
```

Enter the Unit ID for the MiniLink PD (MLPD) of the loop you wish to search and press <ENTER>. The MLPD is always address 60 on each loop. So the unit ID of any particular MLPD would be the loop number followed by 60. In the example above, Loop 1, address 60 has been entered. Once communication is established, the *00* message will go away. Then press <↓>.

NOTE: If the *00* remains, it indicates a communication failure to the controller.

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

```
VCM V.XXX
NO OVERRIDES
```

```
VCM V.XXX
OVERIDES PRESENT
SCROLL DOWN TO VIEW
```

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

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

Enter the Unit ID of the controller the Service Tool is connected to and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

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

Week Schedules

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

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

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.
**Operator Interfaces**

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

The Modular System Manager SD allows you to view any input or output status and change any setpoint to fine-tune the operations of the total system. All keypad operations are simple and straightforward, utilizing non-cryptic plain English messages.

**Display Screens & Data Entry Keys**

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

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<th>Keypad Description</th>
<th>Key Function</th>
<th>Modular System Manager SD</th>
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<tbody>
<tr>
<td>ESC</td>
<td>Use this key to exit from screens or from data entry or to return to the Main Screen from any screen in the system.</td>
<td></td>
</tr>
<tr>
<td>ENTER</td>
<td>Use this key to enter a new value.</td>
<td></td>
</tr>
<tr>
<td>Clear</td>
<td>If a data entry mistake is made, press this key to clear the data entry field and start over.</td>
<td></td>
</tr>
<tr>
<td>Minus</td>
<td>If a setpoint with a negative value is required, press this key for the minus sign.</td>
<td></td>
</tr>
<tr>
<td>DEC</td>
<td>Press this key when entering data that requires a decimal point.</td>
<td></td>
</tr>
<tr>
<td>≗ ≈</td>
<td>Use these keys to change values in the Configuration Screens as prompted.</td>
<td></td>
</tr>
<tr>
<td>↑ ↓</td>
<td>Use these keys to step backward or forward through the screens.</td>
<td></td>
</tr>
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**Mode Selection Buttons**

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

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<td>Pressing this button takes you directly to the controller “Status” screens.</td>
</tr>
<tr>
<td>SETPOINTS</td>
<td>Pressing this button takes you directly to the controller “Setpoints” screens and “Configuration” menu.</td>
</tr>
<tr>
<td>SCHEDULES</td>
<td>Pressing this button takes you directly to the controller “Schedules” screens.</td>
</tr>
<tr>
<td>OVERRIDES</td>
<td>Pressing this button takes you directly to the controller “Overrides” screen. See the “Override Button” section on page 21 for a description of this function. See Notes 1 &amp; 2 below.</td>
</tr>
<tr>
<td>ALARMS</td>
<td>Pressing this button takes you directly to the controller “Alarms” screen. See the “Alarms Button” section on page 21 for a description of this function. See Notes 1 &amp; 2 below.</td>
</tr>
</tbody>
</table>

**Notes:**

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

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

Table 4: Button Descriptions
System Manager SD Initialization

System Manager SD Initialization Screen and Setup Screens

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

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

![Initialization Screen](image)

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

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

5) Alarm Search
NEXT) More Options
ESC) Exit Menu

Setting The Time & Date

The System Manager SD is equipped with a real time clock chip allowing it to maintain the correct time. Once you have programmed the correct time and date, the information is broadcast globally to all controllers on the entire system.

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

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

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

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

Programming the Time

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

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

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

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

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

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

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

Minutes - Enter the Minutes
(0 to 59)

Programming the Date

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

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

Month - Enter the Month (1 to 12)
Day - Enter the Day of the Month (1 to 31)
Year - Enter the current Year (0 to 99)

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

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

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

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

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

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

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

The Passcode Clearance Screen will appear as shown below.
System Manager Passcodes

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Loop Search**

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

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

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

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

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

Loop Search
Current Loop = XX
Loops Found = XX
Searching

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

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

Loop Search
Finished
Loops Found = XX
Press ESC to Exit

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

**System Alarm Search**

The System Manager can be used to search for all active alarms on the system. You must configure the MiniLink PD to allow for “Alarm Polling” for each controller you want polled for alarms. See the MiniLink PD programming section on page 77 of this manual for setting information.

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

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

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

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

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

Loop Search
Current Loop = XX
Loops Found = XX
Searching

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

Alarm Screen
SEARCHING!

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

Alarm Screen
XX ALARMS ON UNIT XX
To check controllers individually for alarms, use the <ALARMS> button on the Main Display.

## Unit Alarm Search

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

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

![Unit Selection Screen]

Enter the Unit ID of the controller you wish to search and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

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

![Controller Screen]

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

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

### System Manager Override Search

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

When a space sensor with override option is used with any VAV/Zone Controller or Unit Controller, the System Manager can determine and report any controllers that are currently operating in an override condition. This function requires that a MiniLink PD is installed on each loop where the controllers may be located. The MiniLink PD must be configured to allow for “Alarm Polling” for each controller that Override Polling Enabled is desired for this function to work. See the MiniLink PD programming section on page 77 of this manual for setting information.

To access the *Space Sensor Overrides Screen*, press <OVERRIDES>.

The following screen will appear.

![Overrides Screen]

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

![Overrides Screen]

*Loop = 1  Unit = 59  OVERRIDE FOUND*
Scheduling

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

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

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

NOTE: If the *00* remains, it indicates a communication failure to the controller.

The Unit Schedule Menu will be displayed.

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

Week Schedules

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

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

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

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

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

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

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

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

CAUTION: The controller ships with all schedules set to zero so that the controller will not attempt to heat or cool before you have configured the system.
Holiday Start/Stop Day Selection

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

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

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

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

**EXAMPLE:**

704 = July 4th

(NOTE: Leading zero not required)

1225 = December 25th

Holiday Start/Stop Times

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

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

The fourteen holidays all use the same Start and Stop times which you program on this screen and the next. You must enter the time in 24-hour military format, the same as a regular week schedule.

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

Schedule Override

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

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

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

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

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

**NOTE:** Do not use the Force OFF mode in place of setting all the week schedules to ZERO if you are using a Remote Signal for your scheduling since the Override has priority over the Remote Signal.
VCM Configuration Screen Index

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

| Screen #1 | Duct Static Pressure Control |
| Screen #2 | Supply Fan Cycle Mode |
| Screen #3 | HVAC Mode Enable |
| Screen #4 | HVAC Reset Source |
| Screen #5 | Reset Interval Rate |
| Screen #6 | Dehumidification Control |
| Screen #7 | Dehumidification Priority |
| Screen #8 | Dehumidification Unoccupied |
| Screen #9 | Outdoor Humidity Sensor |
| Screen #10 | Indoor Humidity Sensor |
| Screen #11 | Heat During Dehumidify |
| Screen #12 | Economizer Control |
| Screen #13 | Proof of Flow Input |
| Screen #14 | Modulating Cooling/Heating |
| Screen #15 | Modulating Heat Output Signal |
| Screen #16 | Modulating Heat Reverse Acting |
| Screen #17 | Modulating Heat Proportional Window |
| Screen #18 | Modulating Cooling Output Signal |
| Screen #19 | Digital Compressor Signal |
| Screen #20 | Modulating Cooling Reverse Acting |
| Screen #21 | Modulating Cool Proportional Window |
| Screen #22 | CO₂ Sensor Output Signal |
| Screen #23 | CO₂ Sensor Maximum Scale |
| Screen #24 | Building Pressure Modulating Control |
| Screen #25 | Building Pressure Reverse Acting |
| Screen #26 | Building Pressure Output Signal |
| Screen #27 | Heat Pump Control |
| Screen #28 | Reversing Valve Active For Heat/Cool |
| Screen #29 | Emergency Shutdown Input |
| Screen #30 | Return Air Bypass Control |
| Screen #31 | Broadcast Outdoor Temperature |
| Screen #32 | Broadcast Outdoor Humidity |
| Screen #33 | Broadcast Supply Temperature |
| Screen #34 | Broadcast Status Fan & Heat |
| Screen #35 | Broadcast Internal Time Clock |
| Screen #36 | Broadcast Internal Schedule |
| Screen #37 | Broadcast VAV Boxes Force to Max |
| Screen #38 | Broadcast VAV Boxes Force to Fixed |
| Screen #39 | 1 HVAC Unit w/Boxes on Multiple Loops |
| Screen #40 | Unit Uses R410A Refrigerant |
| Screens #41-44 | Cooling & Heating Staging Delays |
| Screens #45-64 | Relay Configuration Screens |
Configuration Screens

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

Modular Service Tool Instructions

No matter what screen or menu you’re in, press <CONFIGURATION>. The Unit Selection Screen will appear, shown below, requesting that you enter the unit ID number.

![Unit Selection Screen]

Enter the correct unit ID number of the VCM Controller you want to configure and then press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓> You will then see Unit Configuration Screen #1. Press <ENTER> to save entered data and press <↓> to scroll through the screens.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

System Manager SD Instructions

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

![System Manager SD Instructions]

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

![Unit Selection Screen]

Enter the Unit ID of the controller you wish to change schedules for and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

The following screen will be displayed:

![Configuration Screen #1 - Duct Static Pressure]

If the HVAC unit has a Supply Fan that delivers a Constant Volume of air, select NO. If the HVAC unit has a Supply Fan that delivers a Variable Volume of Air using a VFD or a Bypass Damper, select YES. Default is YES.

![Configuration Screen #2 - Supply Fan Cycle]

If you want the HVAC unit’s Supply Fan to run during Heating, Cooling, or Dehumidification Modes, select 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, select NO. Default is NO.
VCM Configuration Screens

Configuration Screen #3 - HVAC Mode Enable

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.

Configuration Screen #4 - HVAC Reset Source

The Supply Air Heating and Cooling Temperature Setpoints can be reset using various input sources. Default is No Reset. Select the desired Reset Source for Supply Air Temperature Reset. If No Reset Source is selected, the Supply Air Setpoint will not be Reset. The Reset Source Setpoints will then become the Supply Air Heating and Cooling Setpoints. If the Remote Reset Input is selected, then the Reset Source will be the Supply Air Temperature Setpoints when the Remote Input is not active. When the Remote Input is active, the new Supply Air Temperature Setpoints will be the Remote Reset Setpoints that are on Setpoint Screen #5.

The selections are:

- **No Reset**
- **Space Sensor**
- **Remote Reset Signal**
- **Fan VFD Percentage**
- **Return Air Sensor**

Configuration Screen #5 - Reset Interval Rate

If you selected Space or Return Air Temperature Reset in Screen #4, enter a value in seconds between 1-255. This value determines how fast the Supply Air Temperature Setpoint is adjusted as the Reset Source changes. Default is 20 seconds.

Configuration Screen #6 - Dehumidification Control

Select YES if your system requires Dehumidification Control. Default is NO.

Configuration Screen #7 - Dehumidification Priority

Select 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. Default is NO.

Configuration Screen #8 - Dehumidification Unoccupied

Select YES if Dehumidification is required during the Unoccupied mode. Unoccupied Dehumidification is activated based on Indoor Air Humidity only. Default is NO.
**VCM Configuration Screens**

**Configuration Screen #9 - Outdoor Humidity Sensor**

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
<th>Outdoor Humidity Sensor: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use &lt; Or &gt; To Change</td>
<td></td>
</tr>
</tbody>
</table>

Select YES if the HVAC unit is equipped with an Outdoor Air Humidity Sensor. Default is NO.

**Configuration Screen #10 - Indoor Humidity Sensor**

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
<th>Indoor Humidity Sensor: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use &lt; Or &gt; To Change</td>
<td></td>
</tr>
</tbody>
</table>

Select YES if the HVAC unit is equipped with an Indoor Air Humidity Sensor. Default is NO.

**Configuration Screen #11 - Heat During Dehumidify**

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
<th>Heat During Dehumidify: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use &lt; Or &gt; To Change</td>
<td></td>
</tr>
</tbody>
</table>

Select 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. Default is NO.

**Configuration Screen #12 - Economizer Control**

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
<th>Economizer Control: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use &lt; Or &gt; To Change</td>
<td></td>
</tr>
</tbody>
</table>

Select YES if the VCM is controlling the Economizer. Default is NO.

**Configuration Screen #13 - Proof of Flow Input**

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
<th>Proof Of Flow Input: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use &lt; Or &gt; To Change</td>
<td></td>
</tr>
</tbody>
</table>

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

**Configuration Screen #14 - Modulating Cooling/Heating**

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
<th>Mod Cooling: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mod Heating: NO</td>
<td></td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
<td></td>
</tr>
</tbody>
</table>

Select 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. Default is NO.

**Configuration Screen #15 - Modulating Heating Output Signal**

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
<th>Mod Heating Output Signal: 0-10V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use &lt; Or &gt; To Change</td>
<td></td>
</tr>
</tbody>
</table>

Select 0-10 VDC or 2-10 VDC as the output signal for a Modulating Heat Source such as a Hot Water Valve or SCR Electric Heater. Default is 0-10 VDC.
**VCM Configuration**

**VCM Configuration Screens**

**Configuration Screen #16 - Modulating Heating Reverse Acting**

- **VCM Cfg ID 59**
- Mod Heating
- Rev Acting: NO
- Use < Or > To Change

Select YES if the Modulating Heat Source requires 0 VDC to open and 10 VDC to close. Default is NO.

**Configuration Screen #17 - Modulating Heating Proportional Window**

- **VCM Cfg 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 Cfg ID 59**
- Mod Cooling
- Output Signal: 0-10V
- Use < Or > To Change

Select 0-10 VDC as the output signal for a Modulating Cool source such as a Chilled Water Valve. Select 2-10 VDC as the output signal to a Chilled Water Valve. Default is 0-10 VDC.

**Configuration Screen #19 - Digital Compressor Signal**

- **VCM Cfg ID 59**
- Digital Compressor
- Signal 1-5V : NO
- Use < Or > To Change

Select YES if the HVAC unit is equipped with a Digital Compressor. Default is NO.

**Configuration Screen #20 - Modulating Cooling Reverse Acting**

- **VCM Cfg ID 59**
- Mod Cooling
- Rev Acting: NO
- Use < Or > To Change

Select 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. Default is NO.

**Configuration Screen #21 - Modulating Cooling Proportional Window**

- **VCM Cfg 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 - CO₂ Sensor Output Signal**

- **VCM Cfg ID 59**
- CO₂ Sensor
- Output Signal: None
- Use < Or > To Change

The VCM needs to know what type of CO₂ sensor signal output is being provided. Select either 0-10 VDC (standard sensor used) or 4-20 mA as the CO₂ sensor signal. Select None if no CO₂ sensor is used. Default is None.

**Configuration Screen #23 - CO₂ Sensor Maximum Scale**

- **VCM Cfg ID 59**
- CO₂ Sensor Maximum Scale: 2000 PPM
- Enter 0 If No Sensor

The VCM 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. Select None if no CO₂ sensor is used. Default is 2000 PPM.
## VCM Configuration Screens

### Configuration Screen #24 - Building Pressure Modulating Control

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Pressure Mod Control: NO</td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

Select 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. Select 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 #25 - Building Pressure Reverse Acting

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Pressure Rev Acting: NO</td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

Select 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. Default is NO.

### Configuration Screen #26 - Building Pressure Output Signal

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Pressure Output Signal: 0-10V</td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

This Screen is used to configure the Building Pressure Output Signal voltage needed for your application. Select either a 0-10 VDC signal (default) or a 2-10 VDC signal as required by the device you are using to control the pressure. Default is 0-10 VDC.

### Configuration Screen #27 - Heat Pump Control

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Pump Control: NO</td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

Select YES if the HVAC unit is a Heat Pump. Default is NO.

### Configuration Screen #28 - Reversing Valve Active During Heat/Cool

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev. Valve Active For: Heat</td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

Select Heat if your Heat Pump unit activates its Reversing Valve during Heating operation. Select Cool if your Heat Pump unit activates its Reversing Valve during Cooling operation. Default is Heat.

### Configuration Screen #29 - Emergency Shutdown Input

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Shutdown Input: NO</td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

Select 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. Default is NO.

### Configuration Screen #30 - Return Air Bypass Control

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Air Bypass Control: NO</td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

Select YES if your HVAC unit requires Return Air Bypass Control for Dehumidification Reheat. Default is NO.

### Configuration Screen #31 - Broadcast OA Temp

<table>
<thead>
<tr>
<th>VCM Cnfg ID 59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast Outdoor Temperature: NO</td>
</tr>
<tr>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

The VCM 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. Select YES to Broadcast Outdoor Temperature. Default is NO.
**VCM Configuration Screens**

**Configuration Screen #32 - Broadcast OA Humidity**

VCM Cnfg ID 59
Broadcast Outdoor
Humidity: NO
Use < Or > To Change

The VCM 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. Select YES to Broadcast Outdoor Humidity. Default is NO.

**Configuration Screen #33 - Broadcast Supply Temperature**

VCM Cnfg ID 59
Broadcast Supply
Temperature: YES
Use < Or > To Change

This broadcast sends the VCM’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 with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate. Select YES to Broadcast Supply Temperature. Default is NO.

**Configuration Screen #34 - Broadcast Status Fan & Heat**

VCM Cnfg ID 59
Broadcast Status
Fan & Heat: NO
Use < Or > To Change

This broadcast sends the VCM’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 with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate. Select YES to Broadcast Status Fan & Heat. Default is NO.

**Configuration Screen #35 - Broadcast Internal Time Clock**

VCM Cnfg ID 59
Broadcast Internal
Time Clock: NO
Use < Or > To Change

This broadcast sends the time from the VCM’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 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. Select YES to Broadcast Internal Time Clock. Default is NO.

**Configuration Screen #36 - Broadcast Internal Schedule**

VCM Cnfg ID 59
Broadcast Internal Schedule: NO
Use < Or > To Change

This is always required when you have VAV/Zone controllers connected to this VCM Controller. This will broadcast the Occupied and Unoccupied Condition of the VCM Controller to all VAV/Zone controllers on the local loop. Select YES to Broadcast Internal Schedule. Default is NO.

**Configuration Screen #37 - Broadcast VAV Boxes Force to Max**

VCM Cnfg ID 59
Broadcast VAV Boxes
Force To Max: YES
Use < Or > To Change

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. Select YES to Broadcast VAV Boxes Force to Max. Default is YES.

**Configuration Screen #38 - Broadcast VAV Boxes Force to Fixed**

VCM Cnfg ID 59
Broadcast VAV Boxes
Force To Fixed: NO
Use < Or > To Change

Select YES to have all VAV/Zone controllers connected to this VCM Controller forced to their “Fixed Airflow” Position during the Morning Warm-up Mode of operation. See the VAV/Zone Controller Setpoint Screens for setting of the “Fixed Airflow” position. Default is NO.

**Configuration Screen #39 - 1 HVAC Unit with Boxes on Multiple Loops**

VCM Cnfg ID 59
1 HVAC Unit w/ Boxes
On Multi. Loops: NO
Use < Or > To Change
Select 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 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 Controller with VAV/Zone Controllers on multiple loops. Other VCM or add-on devices may be connected but no other VCM with VAV/Zone Controllers can be connected on the system. Default is NO.

Configuration Screen #40 - Uses R410A Refrigerant

Select YES if your HVAC unit uses R410A Refrigerant. Default is NO.

Configuration Screens #41-44 - Cooling & Heating Stage Delays

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Stage Up</td>
<td>3 Min</td>
<td>3 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Cooling Stage Down</td>
<td>1 Min</td>
<td>1 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Cooling Min Run Time</td>
<td>5 Min</td>
<td>5 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Cooling Min Off Time</td>
<td>3 Min</td>
<td>3 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Heating Stage Up</td>
<td>3 Min</td>
<td>3 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Heating Stage Down</td>
<td>1 Min</td>
<td>1 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Heating Min Run Time</td>
<td>2 Min</td>
<td>2 Min</td>
<td>15 Min</td>
</tr>
<tr>
<td>Heating Min Off Time</td>
<td>1 Min</td>
<td>1 Min</td>
<td>15 Min</td>
</tr>
</tbody>
</table>

Configuration Screens #45-64 - Relay Configuration Screens

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
- Pre-Heater
- Heat Stage
- Alarm
- Cool Stage
- Override
- Warmup Mode
- Occupied
- Rev Valve
- OA Damper
- HGR
- Heat Wheel
- Exhaust Fan
- Emerg. Heat

Relays #2 through #21 can be individually configured. By using the 4 relay outputs available on the VCM Controller, the 4 relays on the VCM 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.”
The available Setpoint Screens for the VCM Controller are listed on the next few pages by sequential screen number. When each VCM 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 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 Setpoint Screens in numerical order with a brief listing of the Setpoint feature available on each screen:

<table>
<thead>
<tr>
<th>Setpoint Screen #</th>
<th>Setpoint Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>HVAC Mode Setpoints</td>
</tr>
<tr>
<td>#2</td>
<td>HVAC Mode Select Deadband</td>
</tr>
<tr>
<td>#3</td>
<td>Unoccupied Setbacks</td>
</tr>
<tr>
<td>#4</td>
<td>SAT/Reset Source Setpoints</td>
</tr>
<tr>
<td>#5</td>
<td>Remote SAT Reset Setpoints</td>
</tr>
<tr>
<td>#6</td>
<td>Stage Control Window</td>
</tr>
<tr>
<td>#7</td>
<td>Outdoor Air Lockouts</td>
</tr>
<tr>
<td>#8</td>
<td>Cutoff Temperatures Lo SAT &amp; Hi SAT</td>
</tr>
<tr>
<td>#9</td>
<td>Minimum Supply Fan VFD Speed For Heating</td>
</tr>
<tr>
<td>#10</td>
<td>Morning Warm-up Target Temp &amp; Max Length</td>
</tr>
<tr>
<td>#11</td>
<td>Dehumidification Indoor RH &amp; OA Dewpoint</td>
</tr>
<tr>
<td>#12</td>
<td>Dehumidification Coil Temperature</td>
</tr>
<tr>
<td>#13</td>
<td>Economizer Setpoints OAT/WB Enable</td>
</tr>
<tr>
<td>#14</td>
<td>Economizer Setpoints Min Position &amp; Control Rate</td>
</tr>
<tr>
<td>#15</td>
<td>Maximum Economizer Position if High CO₂ Level Occurs</td>
</tr>
<tr>
<td>#16</td>
<td>CO₂ Protection Limit Max Level &amp; Reset Range</td>
</tr>
<tr>
<td>#17</td>
<td>Static Setpoint, Deadband &amp; Control Rate</td>
</tr>
<tr>
<td>#18</td>
<td>Building Pressure Setpoint &amp; Deadband</td>
</tr>
<tr>
<td>#19</td>
<td>Return Air Bypass Damper Factor Setpoint</td>
</tr>
<tr>
<td>#20</td>
<td>Fan Starting Delay Timer</td>
</tr>
<tr>
<td>#21</td>
<td>Mechanical Heat Cool Failures Occur After No Change For</td>
</tr>
<tr>
<td>#22</td>
<td>Preheat/Low Ambient Temperature</td>
</tr>
<tr>
<td>#23</td>
<td>HVAC Schedule</td>
</tr>
<tr>
<td>#24</td>
<td>Push-Button Override Duration</td>
</tr>
<tr>
<td>#25</td>
<td>HVAC Mode Sensor Slide Offset</td>
</tr>
<tr>
<td>#26</td>
<td>Heat Pump Auxiliary Heating Delay</td>
</tr>
<tr>
<td>#27</td>
<td>Heat Wheel Defrost</td>
</tr>
<tr>
<td>#28</td>
<td>Internal Schedule Optimal Start Soak Multiplier</td>
</tr>
<tr>
<td>#29</td>
<td>Trend Log Interval</td>
</tr>
<tr>
<td>#30</td>
<td>Sensor Calibration For SPC &amp; SAT</td>
</tr>
<tr>
<td>#31</td>
<td>Sensor Calibration For RAT &amp; OAT</td>
</tr>
<tr>
<td>#32</td>
<td>Sensor Calibration For Coil</td>
</tr>
</tbody>
</table>
Setpoints - General Procedures

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

```
Unit Selection*00*
Enter Unit ID#
Selected ID#: XXXX
```

Enter the correct unit ID number of the VCM Controller you want to change Setpoints for and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>. You will then see Setpoint Screen #1. Press <ENTER> to save entered data and press <↓> to scroll through the screens.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

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

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

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

```
Unit Selection*00*
Enter Unit ID#
Selected ID#: XXXX
```

Enter the Unit ID of the controller you wish to change schedules for and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
VCM Spts
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 Spts
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

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unoccupied Setbacks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>0°F</td>
<td>30°F</td>
<td>30°F</td>
</tr>
<tr>
<td>Heating</td>
<td>0°F</td>
<td>30°F</td>
<td>30°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #4 - SAT Reset Source

If no reset source has been configured, then these setpoints will be the Supply Air Temperature Cooling and Heating Setpoints. If the Space or Return Air Temperature Sensor is configured as the Reset Source, then these setpoints will be the desired temperature to be maintained for the Reset Source. The Supply Air Temperature will automatically be reset, warmer or colder to maintain the Cooling and Heating Setpoints for the Reset Source. If Remote SAT Reset is configured as the Reset Source, then these setpoints will be used for the Supply Air Temperature Setpoints when the Remote Reset Signal is not active. If Fan VFD Signal is configured as the Reset Source, then the Reset Signal will be the lowest Supply Air Temperature Setpoint for Cooling when the Supply Fan VFD Signal is at 100%. If the Supply Fan VFD Signal is configured as the Reset Source, then the Heating Signal will be the lowest Supply Air Temperature Setpoint for Heating when the Supply Fan VFD Signal is at 0%. See Setpoint Screen #5 for more information on the Supply Fan VFD signal and Remote SAT Reset setup.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset Source Setpoint Cooling</td>
<td>30°F</td>
<td>55°F</td>
<td>80°F</td>
</tr>
<tr>
<td>Reset Source Setpoint Heating</td>
<td>30°F</td>
<td>120°F</td>
<td>200°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #5 - Remote SAT Reset

When Remote SAT Reset is configured as the Reset Source, then these setpoints will be the Supply Air Temperature Cooling and Heating Setpoints when the Remote Reset Input is active. If the Supply Fan VFD Signal is configured as the Reset Source, then the Cooling Setpoint will be the highest Supply Air Temperature Setpoint for Cooling when the Supply Fan VFD Signal is at 0%. If the Supply Fan VFD Signal is configured as the Reset Source, then the Heating Setpoint will be the highest Supply Air Temperature Setpoint for Heating when the Supply Fan VFD signal at 100%. See Setpoint Screen #4 for more information on the Supply Fan VFD signal and Remote SAT Reset setup.

Setpoint Screen #6 - Stage Control Window

When the Unit 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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage Control Window Cooling</td>
<td>5°F</td>
<td>5°F</td>
<td>30°F</td>
</tr>
<tr>
<td>Stage Control Window Heating</td>
<td>5°F</td>
<td>5°F</td>
<td>30°F</td>
</tr>
</tbody>
</table>
Setpoint Screen #7 - Outdoor Air Lockouts

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

The Unit Controller will temporarily disable Heating or Cooling if while in Heating or Cooling Mode the Supply Air Temperature rises above the High SAT Cutoff Temperature Setpoint or falls below the Low SAT Cutoff Temperature Setpoint. See the VCM Controller Technical Guide for detailed information on the Low and High Supply Air Temperature Cutoff sequence of operation.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA Lockouts Cooling</td>
<td>0°F</td>
<td>50°F</td>
<td>100°F</td>
</tr>
<tr>
<td>OA Lockouts Heating</td>
<td>50°F</td>
<td>70°F</td>
<td>150°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #8 - Cutoff Temperature

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lo SAT</td>
<td>0°F</td>
<td>40°F</td>
<td>250°F</td>
</tr>
<tr>
<td>Hi SAT</td>
<td>0°F</td>
<td>170°F</td>
<td>250°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #9 - Minimum Supply Fan VFD Speed For Heating

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Supply Fan VFD Speed For Heating</td>
<td>0%</td>
<td>30%</td>
<td>100%</td>
</tr>
</tbody>
</table>

When the Unit Controller is configured for VAV operation and the controller enters the Occupied Mode, the controller 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 controller will initiate Heating. This is considered Morning Warm-up and will run until the Return Air Temperature rises above the Morning Warm-up Target Temperature or until the Max Length Setpoint time expires.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Warm Up Target Temp</td>
<td>50°F</td>
<td>72°F</td>
<td>90°F</td>
</tr>
<tr>
<td>Morning Warm Up Max Length</td>
<td>0 Min</td>
<td>60 Min</td>
<td>240 Min</td>
</tr>
</tbody>
</table>

Setpoint Screen #10 - Morning Warm Up Temp

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehumidification Spt</td>
<td>Indoor RH</td>
<td>50%</td>
<td>55°F</td>
</tr>
</tbody>
</table>

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.

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehumidification Setpoint Indoor RH</td>
<td>1%</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>Dehumidification Setpoint OA Dewpoint</td>
<td>35°F</td>
<td>55°F</td>
<td>80°F</td>
</tr>
</tbody>
</table>
**Setpoint Screen #12 - Dehumidification Coil Temperature**

- **VCM Spts Dehumidification Coil Temperature Setpoint**: 45°F

During the Dehumidification Mode, the Unit Controller uses the calculated Coil Temperature to activate DX Cooling based on this Dehumidification Coil Temperature Setpoint. The controller 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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehumidification Coil Temperature Setpoint</td>
<td>35°F</td>
<td>45°F</td>
<td>70°F</td>
</tr>
</tbody>
</table>

**Setpoint Screen #13 - Economizer OAT/WB Enable**

- **VCM Spts Economizer Setpoints OAT/WB Enable**: 55°F

If an Outdoor Air Humidity Sensor is not connected to the Unit Controller 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 controller, then a Wetbulb Temperature will be calculated and used instead of the Outdoor Air Drybulb Temperature to determine when Free Cooling can be used.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economizer Setpoints OAT/WB Enable</td>
<td>0°F</td>
<td>55°F</td>
<td>80°F</td>
</tr>
</tbody>
</table>

**Setpoint Screen #14 - Economizer Minimum Position & Control Rate**

- **VCM Spts Economizer Setpoints Min Position**: 10 %
- **VCM Spts Economizer Setpoints 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 10-99. Larger numbers make the Economizer Outdoor Air Damper Actuator modulate faster, smaller numbers make the Outdoor Air Damper Actuator modulate slower.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ Protection Limit Max Level</td>
<td>0 PPM</td>
<td>900 PPM</td>
<td>3000 PPM</td>
</tr>
<tr>
<td>CO₂ Protection Limit Reset Range</td>
<td>0 PPM</td>
<td>100 PPM</td>
<td>1500 PPM</td>
</tr>
</tbody>
</table>

**Setpoint Screen #15 - Economizer Maximum Position if High CO₂ Level**

- **VCM Spts 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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Economizer Position If High CO₂ Level Occurs</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Setpoint Screen #16 - CO₂ Protection Limit**

- **VCM Spts CO₂ Protection Limit Max Level**: 900 PPM
- **VCM Spts CO₂ Protection Limit Reset Range**: 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.
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.

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

Setpoint Screen #19 - RAB Damper Factor

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.

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Air Bypass Damper Factor</td>
<td>0%</td>
<td>40%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Setpoint Screen #17 - Static Setpoint, Deadband & Control Rate

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Spt</td>
<td>0.10&quot; WG</td>
<td>0.50&quot; WG</td>
<td>3.0&quot; WG</td>
</tr>
<tr>
<td>Deadband</td>
<td>0.10&quot; WG</td>
<td>0.10&quot; WG</td>
<td>1.0&quot; WG</td>
</tr>
<tr>
<td>Control Rate</td>
<td>1 Sec</td>
<td>10 Sec</td>
<td>30 Sec</td>
</tr>
</tbody>
</table>

Setpoint Screen #18 - Building Pressure

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 Controller Technical Guide for the complete Building Pressure Control Sequence of Operation.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Air Bypass Damper Factor</td>
<td>0%</td>
<td>40%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Setpoint Screen #20 - Supply Fan Starting Delay Timer

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

**Table: Fan Start Delay Timer**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Start Delay Timer</td>
<td>0 Sec</td>
<td>255 Sec</td>
<td>255 Sec</td>
</tr>
</tbody>
</table>

Setpoint Screen #21 - Mechanical Heat/Cool Failure Time Period

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 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.

**Table: Mechanical Heat/Cool Failures Occur After No Change For**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Heat/Cool Failures Occur After No Change For</td>
<td>0 Min</td>
<td>15 Min</td>
<td>255 Min</td>
</tr>
</tbody>
</table>

Setpoint Screen #22 - Preheat/Low Ambient Temperature

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 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.

**Table: Preheat/Low Ambient Temperature**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat/Low Ambient Temp</td>
<td>0°F</td>
<td>0°F</td>
<td>70°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #23 - HVAC Schedule

The VCM has an Internal Scheduler. If you want the VCM 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.

**Table: HVAC Schedule**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Schedule</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

Setpoint Screen #24 - Push-Button Override Duration

If the Unit Controller 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.

**Table: Push-Button Override Duration**

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push-Button Override Duration</td>
<td>0.0 Hr</td>
<td>2.0 Hr</td>
<td>8.0 Hr</td>
</tr>
</tbody>
</table>
Setpoint Screen #25 - HVAC Mode Sensor Slide Offset

If the Unit Controller 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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Mode Sensor Slide Offset</td>
<td>0°F</td>
<td>0°F</td>
<td>10°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #26 - Heat Pump Auxiliary Heating Delay

If the Unit Controller 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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Pump Auxiliary Heating Delay</td>
<td>0 Min</td>
<td>3 Min</td>
<td>30 Min</td>
</tr>
</tbody>
</table>

Setpoint Screen #27 - Heat Wheel Defrost

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Wheel Defrost</td>
<td>0°F</td>
<td>30°F</td>
<td>50°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #28 - Internal Schedule Optimal Start Soak Multiplier

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 Controller Technical Guide for more detailed information regarding the Optimal Start. This multiplier is only applied if you are using the Unit Controller Internal Schedule.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Schedule Optimal Start Soak Multiplier</td>
<td>0.0</td>
<td>0.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Setpoint Screen #29 - Trend Log Interval

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend Log Interval</td>
<td>1 Min</td>
<td>15 Min</td>
<td>60 Min</td>
</tr>
</tbody>
</table>

Setpoint Screen #30 - Sensor Calibration for SPC & SAT

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Calibration SPC</td>
<td>-100.0°F</td>
<td>0.0°F</td>
<td>+100.0°F</td>
</tr>
<tr>
<td>Sensor Calibration SAT</td>
<td>-100.0°F</td>
<td>0.0°F</td>
<td>+100.0°F</td>
</tr>
</tbody>
</table>
### Setpoint Screen #31 - Sensor Calibration for RAT & OAT

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Calibration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAT</td>
<td>-100.0°F</td>
<td>0.0°F</td>
<td>+100.0°F</td>
</tr>
<tr>
<td>OAT</td>
<td>-100.0°F</td>
<td>0.0°F</td>
<td>+100.0°F</td>
</tr>
</tbody>
</table>

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.

### Setpoint Screen #32 - Sensor Calibration for COIL

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Calibration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COIL</td>
<td>-30.0°F</td>
<td>0.0°F</td>
<td>+30.0°F</td>
</tr>
</tbody>
</table>

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.
### VCM Status Screen Index

<table>
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<tr>
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<th>Status Screen #13</th>
<th>Current Static Pressure and Current Static Pressure Output Signal Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Screen #2</td>
<td>Status Screen #14</td>
<td>Current Building Pressure &amp; Output Percentage</td>
</tr>
<tr>
<td>Status Screen #3</td>
<td>Status Screen #15</td>
<td>Return Air Bypass Damper Signal &amp; Bypass Damper Signal</td>
</tr>
<tr>
<td>Status Screen #4</td>
<td>Status Screens #16-22</td>
<td>Supply Fan and Other Relays</td>
</tr>
<tr>
<td>Status Screen #5</td>
<td>Status Screens #23</td>
<td>Alarm Conditions</td>
</tr>
<tr>
<td>Status Screen #6</td>
<td>Current Static Pressure and Current Static Pressure Output Signal Percentage</td>
<td></td>
</tr>
<tr>
<td>Status Screen #7</td>
<td>Current Building Pressure &amp; Output Percentage</td>
<td></td>
</tr>
<tr>
<td>Status Screen #8</td>
<td>Return Air Bypass Damper Signal &amp; Bypass Damper Signal</td>
<td></td>
</tr>
<tr>
<td>Status Screen #9</td>
<td>Supply Fan and Other Relays</td>
<td></td>
</tr>
<tr>
<td>Status Screen #10</td>
<td>Alarm Conditions</td>
<td></td>
</tr>
<tr>
<td>Status Screen #11</td>
<td>Current Modulating Heating &amp; Cooling Output Signal Percentage</td>
<td></td>
</tr>
</tbody>
</table>
VCM STATUS

VCM Status Screens

Status

The VCM Controller Status Screens are accessed by pressing the <STATUS> button on the Modular Service Tool or Modular System Manager. Enter the correct unit ID number of the VCM Controller you want to configure and press <ENTER>. Once communication is established, the *00* message will go away. Then press < flourish>. You will then see Status Screen #1. Press < flourish> to scroll through the screens.

NOTE: If the *00* remains, it indicates a communication failure to the controller.

Status Screen 1 - Mode

VCM v1.00
Occupied Mode
Vent Mode
03/13/13 05:00 PM

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:
Venting Mode Cooling Mode
Heating Mode Dehumidify 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

VCM v1.00
Cooling Enabled
Heating Enabled
Economizer Disabled

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

VCM v1.00
Enable Tmp.: XX.X°F
Cool Spt.: XX.X°F
Heat Spt.: XX.X°F

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

VCM v1.00
Supply Air.: XX.X°F
Supply Spt.: XX.X°F

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.
### Status Screen 5 - H/C Demand and Space Temp

<table>
<thead>
<tr>
<th>VCM v1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>H/C Demand: XX.X°F</td>
</tr>
<tr>
<td>Space Tmp.: XX.X°F</td>
</tr>
</tbody>
</table>

#### Line 2  Current Heating or Cooling Demand

Based on the comparison between the current HVAC Mode Enable Temperature and the HVAC Mode Heating or Cooling Setpoint Temperatures. This number is calculated by subtracting the HVAC Mode Enable Temperature from either the HVAC Mode Enable Heating Or HVAC Mode Enable Cooling Setpoint values (depending on which Mode is currently active ) to arrive at this value. A positive number indicates a Cooling demand and a negative number indicates a Heating demand.

#### Line 3  Space Temperature

If you are using a Space Temperature Sensor, this line will display the current Space Temperature during the Occupied or Unoccupied Mode.

### Status Screen 6 - Outdoor Air Temperature & Outdoor Air Relative Humidity

<table>
<thead>
<tr>
<th>VCM v1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor Tmp: XX.X°F</td>
</tr>
<tr>
<td>Outdoor RH: XX.X%</td>
</tr>
<tr>
<td>Coil Tmp...: XX.X°F</td>
</tr>
</tbody>
</table>

#### 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 Unit 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 Unit Controller, the Outdoor Air Relative Humidity Percentage will appear on this line. If not, this line will display 0%.

#### Line 4  Current Calculated Evaporator Coil Temperature

If the 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.

### Status Screen 7 - OA Dewpoint & Dewpoint Temp

<table>
<thead>
<tr>
<th>VCM v1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA Dewpoint.: XX.X°F</td>
</tr>
<tr>
<td>Dewpoint Spt: XX.X°F</td>
</tr>
</tbody>
</table>

#### 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.

### Status Screen 8 - Indoor RH & Indoor RH Setpoint

<table>
<thead>
<tr>
<th>VCM v1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor RH....: XXX%</td>
</tr>
<tr>
<td>Indoor RH Spt: XXX%</td>
</tr>
</tbody>
</table>

#### 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.
VCM Status Screens

Status Screen 9 - Economizer %, OA Wetbulb, and CO₂ Level

VCM v1.00
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 10 - Return Air, Supply Air, and Supply Air Temperature Setpoint

VCM v1.00
Return Air.: XX.X°F
Supply Air.: XX.X°F
Supply Spt.: XX.X°F

Line 2  Current Return Air Temperature
This sensor is optional. If a Return Air Temperature Sensor is not used it will display 0°F

Line 3  Current Supply Air Temperature
The Supply Air Temperature Sensor 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 4  Current Active Supply Air Temperature Setpoint
This line displays the Active Supply Air Temperature Setpoint.

Status Screen 11 - MODGAS Output % & MHGRV Output %

VCM v1.00
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 Unit 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 Unit Controller. If you do not have an MHGRV controller connected to your Unit 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 12 - Mod Heating & Cooling %

VCM v1.00
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 Config].
**VCM Status Screens**

**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.

---

**Status Screen 14 - Building Pressure & Output %**

<table>
<thead>
<tr>
<th>VCM v1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Pr...: X.XX”</td>
</tr>
<tr>
<td>Press Output: XXX%</td>
</tr>
<tr>
<td>[Optional Outputs]</td>
</tr>
</tbody>
</table>

**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 Config].

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

---

**Status Screen 15 - Return Air Damper Signal & Bypass Damper Signal**

<table>
<thead>
<tr>
<th>VCM v1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Dmp..: XXX%</td>
</tr>
<tr>
<td>Bypass Dmp..: XXX%</td>
</tr>
<tr>
<td>[Optional Outputs]</td>
</tr>
</tbody>
</table>

**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 Config] 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 Config] will be displayed instead.

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

VCM Status Screens

Status Screens 16-22 - Supply Fan Relay

| VCM v1.00 |
| 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
- Warm-up 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 23 - Alarm Conditions

| VCM v1.00 |
| NO ALARMS! |

| VCM V.XXX |
| ALARMS PRESENT |
| SCROLL DOWN TO VIEW |

Line 2  Blank

Line 3  **NO ALARMS! OR ALARMS PRESENT**
If alarms are present, the screens that follow will display one or more of the following:
- 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

Press <D> to scroll through all active alarms.

For Alarm Definitions, see the *VCM Controller Technical Guide.*
VAV/Zone Configuration

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

Modular Service Tool Instructions

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

Enter the correct unit ID number of the VAV/Zone controller you want to configure, and press <ENTER>. Once communication is established, the *00* message will go away. Then press <.mockito> >. You will then see Unit Configuration Screen #1. Press <ENTER> to save entered data and press <.mockito> to scroll through the screens.

NOTE: If the *00* remains, it indicates a communication failure to the controller.

System Manager SD Instructions

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

Enter the correct passcode and press <ENTER>. Once communication is established, the *00* message will go away. Then press <mockito> >. You will then see Unit Configuration Screen #1. Press <ENTER> to save entered data and press <mockito> to scroll through the screens.

NOTE: If the *00* remains, it indicates a communication failure to the controller.

The following screen will be displayed:

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

Configuration Screen #1 - Box Configuration

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

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

Select Direct Acting or Reverse Acting. If the damper opens in a clockwise direction, it is DIRECT ACTING. If the damper opens in a counter-clockwise direction, it is REVERSE ACTING.

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

**VAV/Zone Configuration Screens**

**Configuration Screen #3 - Voting Zone**

<table>
<thead>
<tr>
<th>XX Box Cnfg IDXXXX</th>
<th>Is This Box a Voting Zone...: YES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

Select YES if this is a Zoned System so that the box can be included as a voting zone.

**Configuration Screen #4 - Pressure Independent Airflow Constant**

<table>
<thead>
<tr>
<th>XX Box Cnfg IDXXXX</th>
<th>Pr Independent Boxes Airflow @ 1&quot; WG Constant...: 1200 CFM</th>
</tr>
</thead>
</table>

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

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

<table>
<thead>
<tr>
<th>XX Box Cnfg IDXXXX</th>
<th>Expansion Relays [Optional] Steps of Reheat.: 2</th>
</tr>
</thead>
</table>

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**

<table>
<thead>
<tr>
<th>XX Box Cnfg IDXXXX</th>
<th>Proportional Heating Signal...: 0 - 10 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

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

**Configuration Screen #7 - Box Heat Allow**

<table>
<thead>
<tr>
<th>XX Box Cnfg IDXXXX</th>
<th>Allow Box Heat With HVAC Heat....: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

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

**Configuration Screen #8 - Main Fan Status**

<table>
<thead>
<tr>
<th>XX Box Cnfg IDXXXX</th>
<th>This Unit Needs Main Fan Status....: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use &lt; Or &gt; To Change</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>XX Box Cnfg IDXXXX</th>
<th>Push-Button Override Group ID #: 1</th>
</tr>
</thead>
</table>

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

If this system has 1 HVAC unit controlling boxes on multiple loops and the HVAC unit is on a different loop than this box, select YES; otherwise, select NO.
VAV/Zone Controller Setpoints

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

```
Unit Selection*00*
Enter Unit ID#
Selected ID#: XXXX
```

Enter the correct unit ID number of the Controller you want to change Setpoints for and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>. You will then see Setpoint Screen #1. Press <ENTER> to save entered data and press <↑> to scroll through the screens.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

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

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

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

```
Unit Selection*00*
Enter Unit ID#
Selected ID#: XXXX
```

Enter the Unit ID of the controller you wish to change schedules for and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

The following screen will be displayed:

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

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

**Setpoint Screen #1 - Occupied Setpoints**

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

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

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

Setpoint Screen #4 - Auxiliary Heat Setpoint

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

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

Setpoint Screen #5 - Damper Airflow Integral

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

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

Setpoint Screen #6 - Damper Airflow Max & Vent Min

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.

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

Setpoint Screen #7 - Damper Airflow Cool/Heat Minimum

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool Min</td>
<td>0% or 0 CFM</td>
<td>10% or 100 CFM</td>
<td>100% or 30000 CFM</td>
</tr>
<tr>
<td>Heat Min</td>
<td>0% or 0 CFM</td>
<td>10% or 100 CFM</td>
<td>100% or 30000 CFM</td>
</tr>
</tbody>
</table>
The Night Min is the position the damper will move to when the system is in Override Mode and this particular damper is not part of the override group. This Night Min position only affects non-fan powered boxes. The Fan On Min is the minimum damper or airflow setting used to activate the parallel fan if installed. Pressure Independent = CFM. Pressure Dependent = %.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night Min</td>
<td>0% or 0 CFM</td>
<td>0% or 0 CFM</td>
<td>100% or 9999 CFM</td>
</tr>
<tr>
<td>Fan On Min</td>
<td>0% or 25% or 200 CFM</td>
<td>100% or 9999 CFM</td>
<td></td>
</tr>
</tbody>
</table>

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

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

Many times while troubleshooting a system, it is useful to have the zone damper set to a specific damper position or airflow setting. This setpoint can be used to determine where the damper/airflow will remain when the VAV/Zone Controller receives a Force to Fixed Position command.

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

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.

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

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

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

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

Setpoint Screen #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 Controller. Enter <0> to operate on the AHU schedule. Enter <1-5> to use an external schedule. A GPC Plus is required for schedules 1-5.

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

Setpoint Screen #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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect on SP</td>
<td>0°F</td>
<td>0°F</td>
<td>6°F</td>
</tr>
</tbody>
</table>

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.

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

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.

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

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

XX Box Spts IDXXXX
Sensor Calibration
SPC: XXX.X°F XXX.X°F
SAT: XXX.X°F XXX.X°F
[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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC (Space Temp)</td>
<td>-100°F</td>
<td>0°F</td>
<td>+100°F</td>
</tr>
<tr>
<td>SAT (Supply Air)</td>
<td>-100°F</td>
<td>0°F</td>
<td>+100°F</td>
</tr>
</tbody>
</table>
VAV/ZONE CONTROLLER STATUS

VAV/Zone Status Screens

VAV/Zone Status

Status Screen #1 - Mode of Operation

<table>
<thead>
<tr>
<th>Line</th>
<th>Mode of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Unoccupied Mode</td>
</tr>
<tr>
<td></td>
<td>Occupied Mode</td>
</tr>
<tr>
<td></td>
<td>Override Mode</td>
</tr>
<tr>
<td></td>
<td>Override Pending*</td>
</tr>
<tr>
<td></td>
<td>Damper Calibration</td>
</tr>
<tr>
<td></td>
<td>Group Override</td>
</tr>
<tr>
<td>3</td>
<td>OFF Mode</td>
</tr>
<tr>
<td></td>
<td>Vent Mode</td>
</tr>
<tr>
<td></td>
<td>Cooling Mode</td>
</tr>
<tr>
<td></td>
<td>Heating Mode</td>
</tr>
<tr>
<td></td>
<td>Sensor Fail Mode**</td>
</tr>
<tr>
<td>4</td>
<td>Belongs to Group # xx</td>
</tr>
<tr>
<td></td>
<td>No Group Affiliation</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Current Zone Temperature</td>
</tr>
<tr>
<td>3</td>
<td>Currently active Cooling Setpoint based on the current Occupied / Unoccupied mode of operation.</td>
</tr>
<tr>
<td>4</td>
<td>Currently active Heating Setpoint based on the current Occupied / Unoccupied mode of operation.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>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.</td>
</tr>
<tr>
<td>3</td>
<td>Current Heating or Cooling Demand in the Zone based on the current Heating and Cooling Setpoints when compared to the current Zone Temperature.</td>
</tr>
<tr>
<td>4</td>
<td>Blank</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>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.</td>
</tr>
<tr>
<td>3</td>
<td>Current Box Air Temperature If you have configured the VCM 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.</td>
</tr>
<tr>
<td>4</td>
<td>Blank</td>
</tr>
</tbody>
</table>
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.

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 %”.

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 reheating, this line will display the total number of active heating stages.

Status Screen #7 - Alarm Status

XX Box v1.04 IDXXXX
NO ALARMS!

XX Box v.104 IDXXXX
ALARMS PRESENT
SCROLL DOWN TO VIEW

Line 2  Blank

Line 3  NO ALARMS!
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

Press < Down > to scroll through all active alarms.

For Alarm Definitions, see the VCM Controller Technical Guide.
VAV/ZONE DAMPER FORCE

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 Modular Service Tool.

**Modular Service Tool Instructions**

When using the Modular Service Tool, simply press the `<BALANCE - TEST>` key. You will then see the Unit ID Screen. Enter the unit ID of the controller you wish to access and press `<ENTER>`. Once communication is established, the *00* message will go away. Then press `<EXIT>`.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

The following screen will be displayed:

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

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

**Dampers Force Mode Screen**

If the unit ID you entered is for a VCM 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 Controller’s communication loop will be forced to the same Damper Force Mode setting. If the unit ID you entered is for a VAV/Zone Controller, the Damper Force Mode setting will only apply to that VAV/Zone Controller.

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

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

- **0 = Auto** This is the default setpoint. With this setting, the damper will operate normally and modulate according to the controller setpoints.
- **1 = Open** This setting will force the dampers to their fully-open position.
- **2 = Clsd** This setting will force the damper to its fully-closed position.
- **3 = Max** This setting will force the damper to its Maximum Position Setpoint. See VAV/Zone Controller Setpoint Screen #5 on page 51 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 51 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 52 for complete setpoint information.

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

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

Modular Service Tool Instructions

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

```
Unit Selection*00*
Enter Unit ID#
Selected ID#: XXXX
```

All MiniLink PDs are set at address 60. Enter the correct unit loop number for the loop the MiniLink Polling Device is connected to (for Loop 1 you would enter <160>) and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

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

System Manager SD Instructions

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

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

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

```
Unit Selection*00*
Enter Unit ID#
Selected ID#: XXXX
```

Enter the Unit ID of the controller you wish to change schedules for and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

The following screen will be displayed:

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

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

**Configuration Screen #1 - System Type**

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

Select VAV or ZONING. 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. Valid entry is 1 to 25.

**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. Valid entry is 5 to 60 minutes.
MiniLink PD Configuration & Status Screens

**Configuration Screen #4 - Optimal Start**

Polling Unit Config
Optimal Start
Target Zone...: XX
[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”. Valid entry is -1 to 58.

**Configuration Screen #5 - Maverick Testing**

Polling Unit Config
Maverick Testing
Disabled: YES
Use < Or > To Change

Select YES or NO. 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
Use < Or > To Change

Select YES or NO. Enabling Alarm Polling allows any alarm from the loop to be polled. You must set this for each controller on the loop.

---

**MiniLink PD Status**

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

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.
**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 Unit Controller you wish to access and press `<ENTER>`. Once communication is established, the *00* message will go away. Then press `<>`. You will then see the screen shown below. Press `<ENTER>` to save entered data and press `<>` to scroll through the screens.

**NOTE:** If the *00* remains, it indicates a communication failure to the controller.

**NOTE:** The Outputs Force settings are only available for the VCM Controller. They are not supported for the VAV/Zone Controllers or other Add-on controllers.

The first Outputs Force Screen allows the AHU fan relay to be set for Auto, Force On, or Force Off. The default setting is Auto. After you complete all troubleshooting or testing procedures, all relays should be changed back to this setting. The Force On setting will force the relay to the ON (energized) position. The Force Off selection will force the relay to the OFF (de-energized) position.

The next screen displays the Relay Overrides for Relay 2. After pressing `<ENTER>` to save any changes, press `<>` to have the next relay displayed. All 20 Relay Override Screens (including the AHU fan relay) are available by pressing `<<ENTER>>`.

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

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 then press `<>` and the next Analog Output Override Screen will be displayed.

Place the cursor on Outputs Force and press `<ENTER>` to access the Outputs Force Screen.
TROUBLESHOOTING

VCM Outputs Force

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

```
Unit Selection*00*
Enter Unit ID#
Selected ID#: XXXX
```

Enter the network unit ID for the controller you want to save the setpoints from. Example, ‘102’ for Loop 1 / Unit 2. Then press <ENTER>. Once communication is established, the *00* message will go away. After a brief pause, press <↓> to get to the Balance - Test Screen shown below.

```
Outputs Force Para Blocks Save/Copy/Restore
```

Scroll down to the ‘Save/Copy/Restore’ option and press <ENTER>. This will take you to the Save Setpoints screen.

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

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

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

```
Unit Selection*00*
Enter Unit ID#
Selected ID#: XXXX
```

Enter the Unit ID of the controller you wish to change schedules for and press <ENTER>. Once communication is established, the *00* message will go away. Then press <↓>.

NOTE: If the *00* remains, it indicates a communication failure to the controller.

The following screen will be displayed:

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

Scroll down to the ‘Save/Copy/Restore’ option and press <ENTER>. This will take you to the Save Setpoints screen.

Save Setpoints - Network Mode
From the Save Setpoints Screen shown below:

```
Save Setpoints Press Enter To Save
```

Press <ENTER> and a setpoint file will be saved to the SD card. You will receive a message that the save was successful. This file is specific to this controller on this loop.
**APPENDIX A - SAVE, LOAD, COPY SETPOINTS**

**Copying & Restoring Previously Saved Setpoints**

### Copy Setpoints - Network Mode

To copy a saved setpoints file to other controllers on the network do the following:

From the **Save Setpoints Screen** shown below:

![Save Setpoints Screen]

Press ↓ four times to access the **Copy Setpoints Screen** shown below.

![Copy Setpoints Screen]

In the ‘From Loop’ field, enter the Loop of the controller you want to copy the setpoints from. In this example it is ‘1’. Then press <ENTER>.

In the ‘From Unit’ field, enter the Unit ID of the controller you want to copy the setpoints from. In this example it is ‘2’. Then press <ENTER>.

Now your cursor will be on the last line, and you can press <ENTER> once more to copy the setpoint file from unit 102 to unit 103.

You will receive a confirmation that the copy was successful.

### Restore Setpoints - Network or Stand-Alone Mode

The **Restore Setpoints feature** is used to reload a saved setpoints file from one controller back to itself. This could be useful if setpoints or configurations were changed and need to be reset.

You can perform this function on a networked system; however, the **Modular Service Tool needs to be directly connected to the controller you wish to restore previously saved setpoints to**.

From the **Save Setpoints Screen** shown below:

![Save Setpoints Screen]

Press ↓ four times to access the **Restore Setpoints Screen** shown below.

![Restore Setpoints Screen]

Press <ENTER>. This will reload the setpoints from the saved file. You will receive confirmation that the setpoints were loaded successfully.

### Save & Copy Setpoints - Stand-Alone Mode

The instructions for Stand-Alone Mode are exactly the same as Network Mode, except that there is no need to enter a Loop number in the Unit ID number field and in the **Copy Setpoints Screen**, enter a zero in the ‘From Loop’ field.
Updating Your SD Memory Card

You may need to update your SD memory card from time to time, either for a new release or to add data for another Controller.

Follow the instructions below to download the update file from our tech support webpage:

1. Insert the SD memory card in your computer’s SD drive and open the drive’s window.
2. Open your browser and type in the address: http://wattmaster.com/techsupport.
3. On the Tech Support webpage, locate the file Modular_HH_Screens.zip and double-click on it.
4. Click <Save File> when asked to save or open the file and then click <OK>. This option will save the file to the “Downloads” folder on your PC.

5. Open the “Downloads” folder in Windows Explorer. You will find a folder labeled, “Modular_HH_Screens.zip.” Right-click on this folder and choose “Extract All” from the options list. **NOTE:** Any compression software can be used to extract the zip folder’s contents, for example, Winzip.

6. Once you unzip the file, you will see a window similar to the one below.

7. Press <CTRL> <A> to highlight the folders in the window—App, Manuals & Scr. Press <CTRL> <C> to copy the folders.
8. Paste the files into the SD memory card drive’s window by pressing <CTRL> <V>.
9. Remove the SD Memory Card from your computer and reinsert it in the Modular Hand Held Service Tool or Modular System Manager.
APPENDIX C - UPDATING CONTROLLERS & E-BUS MODULES

Updating Controller & E-BUS Module Software

Updating Software Using the Modular Service Tool SD

To update the software for various WattMaster controllers and E-BUS Modules, follow these simple steps.

1. Update your SD memory card with the new software file for the controller or E-BUS module you need to update. Follow the steps on page 63 for Updating the SD memory card.

2. Connect the Modular Service Tool to the device you wish to update using the mini DIN communication cable or EBC E-BUS cable provided.

3. Power up the controller or E-BUS module you wish to update.

4. Apply power to the Modular Service Tool SD and press the <ON> button.

5. After initialization of the Modular Service Tool SD, press <NEXT> at the first Setup Screen and <4> at the second Setup Screen shown below.

6. The Update Software Screen will appear as shown below:

7. Follow the instructions for WattMaster Controllers or E-BUS Modules.

WattMaster Controllers

1. Press <1> to update a WattMaster Controller. The following screen will appear:

   Enter Board Address
   0
   Esc) Exit Menu

2. Enter the address of the controller you are updating and then press <ENTER>.

3. The Software Version Screen will appear as shown below. Enter <0> for the latest software version or enter the number of an older version given to you by Technical Support. Then press <ENTER>.

   Software Version
   Enter 0 for Latest
   0
   Esc) Exit Menu

4. The screen will display the following messages: “Resetting Unit” “Load Sys Info”

5. If communications are successful, the screen will display, the name of the HEX file on the top line, “Flash Memory Erased” on the second line, and the progress percentage on the third line.

   NOTE: If communications are not successful, the screen will display, “Press Any Key to Continue. Cannot Load Sys Info.” Make sure you have the right address and the right software version on your SD card. If these two items are correct and you still experience a problem, contact Technical Support.

6. When updating is complete, the screen will display, “Finish Download.”
E-BUS Modules

1. Press <2> to update an E-BUS Module. The following screen will appear:

   Enter Board Address
   0
   Esc) Exit Menu

2. Enter the address of the E-BUS module you are updating and then press <ENTER>. The following is the list of Module addresses:

   WSHP-X - address 17
   MHGRV-X - address 132
   MODGAS-X - address 138

3. The Software Version Screen will appear as shown below. Enter <0> for the latest software version or enter the number of an older version if given to you by Technical Support. Then press <ENTER>.

   Software Version
   Enter 0 for Latest
   0
   Esc) Exit Menu

4. The screen will display the following messages:
   “Resetting Unit”
   “Load Sys Info”

5. If communications are successful, the screen will display, the name of the HEX file on the top line, “Flash Memory Erased” on the second line, and the progress percentage on the third line.

   NOTE: If communications are not successful, the screen will display, “Press Any Key to Continue. Cannot Load Sys Info.” Make sure you have the right address and the right software version on your SD card. If these two items are correct and you still experience a problem, contact Technical Support.

6. When updating is complete, the screen will display, “Finish Download.”
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