SA Controller Operator Interfaces Technical Guide

SA Controller Code: Y200921
Requires System Manager Code: Y200921SM Version 1.0 and up
Requires Service Tool Code: Y200921HH Version 1.0 and up
# Table of Contents

## INTRODUCTION
- Modular Service Tool ................................................................. 3
- Modular System Manager .............................................................. 3

## SYSTEM CONNECTIONS
- Modular Service Tool .................................................................. 4
- Modular System Manager .............................................................. 5
- Power/Comm Board Wiring .......................................................... 6
- Modular System Manager - Stand Alone ........................................ 7

## INTERFACES OVERVIEW
- Service Tool and System Manager Keys ....................................... 8
- Operator Interfaces Comparison ................................................... 8
- Service Tool and System Manager ................................................ 9
- System Manager Initialization ....................................................... 10
- System Manager Passcodes .......................................................... 12
- Modular Service Tool Initialization ............................................... 13

## SYSTEM CONFIGURATION
- VAV and CAV Configurations ...................................................... 15
- MUA Unit .................................................................................... 16
- Heat Pump .................................................................................. 16

## PROGRAMMING
- SA Controller Configuration Screen Index .................................. 17
- SA Controller Configuration Screens ........................................... 18
- SA Controller Setpoint Screen Index ............................................ 25
- SA Controller Setpoint Screens ................................................... 26
- SA Controller Scheduling ............................................................. 35
- Damper Force Modes ................................................................. 37
- Outputs Force ............................................................................. 38
- SA Controller Status Screens ...................................................... 40
- VAV/Zone Controller Configuration Screens ................................. 46
- VAV/Zone Controller Setpoint Screens ....................................... 48
- VAV/Zone Controller Status Screens .......................................... 52
- VAV/Zone Controller Damper Force Modes ................................. 54
- MiniLink PD Configuration Screens ............................................ 55
- MiniLink PD Status Screens ........................................................... 56

## INDEX ...................................................................................... 57
Introduction

Modular Service Tool and System Manager

Modular Service Tool

Description

The OE391-08 Modular Service Tool is a system operator interface that provides a direct link in viewing the status, configuring, and adjusting the setpoints of any SA Controller on the control system communications loop. The Modular Service Tool is housed in an attractive beige-colored plastic enclosure. The display area is covered with a clear plastic bezel for protection of the display screen. The Modular Service Tool has a 4-line-by-20-character display panel with adjustable contrast control and a 27-key membrane keypad for data selection and entry. All keypad operations are simple and straightforward, utilizing non-cryptic plain English language messages. Menu-driven programming allows for easy setup and operation without the need for specialized training. The OE391-08 Modular Service Tool is supplied with (4) AA 1.5 V Volt alkaline batteries, a wall mount DC power supply and a communication cable terminated with an 8-pin DIN connector for connection to the Service Tool. The cable allows you to setup and program your SA Controller with an 8-pin DIN connector socket by simply plugging the service tool into the socket on the controller.

The Modular Service Tool is designed to be hand-carried. Its rugged plastic housing provides superior protection for the electronic components housed inside. The OE391-08 Modular Service Tool is a top-quality service tool that will stand up to the demands of the typical job site environment for many years.

Modular System Manager

Description

The OE392-08 Modular System Manager provides a direct link to enable you to view the status and adjust the setpoints of any controller on the control system communications loop. The Modular System Manager is designed to be used with the Orion Control System. The System Manager is housed in an attractive, off-white colored plastic enclosure. The System Manager is equipped with a 4-line-by-20-character backlit display panel and a 24-key membrane keypad for data selection and entry. All keypad operations are simple and 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 Orion System, the Modular System Manager is connected to the communications and power loop of the system via modular cables that simply plug into the System Manager board and the Power/Comm Distribution Board. This virtually eliminates wiring errors and makes installation fast and easy. When it is to be connected to a Stand-Alone system, a cable with modular connectors on one end and stripped wire ends on the other end is provided to facilitate connecting communications and power to the Modular System Manager from the 24 VAC power source and the HVAC unit controller communication wiring terminals.

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

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

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

---

Figure 3: Modular Service Tool
Modular System Manager

As previously described, when you are connecting the Modular System Manager to a Networked System, the Modular System Manager is connected to the communications and power loop of the system via modular cables. These cables simply plug into the System Manager board and to any device with modular connectors on any local loop on the system. Devices with modular connectors include the Power/Comm Distribution Board, VAV/Zone Controller, and MiniLink Polling Device. By using these plug-in connections, wiring errors are virtually eliminated and system installation is fast and easy. See Figure 4 below for typical connection information. See Figure 5 on page 6 for typical Power/Comm board wiring and connection information.

When the System Manager is to be connected to a Stand Alone system, a 12-foot cable with modular connectors on one end and stripped wire ends on the other end is provided for this purpose. This is used to facilitate connecting communications and power wiring to the Modular System Manager from a 24 VAC power source and to the HVAC unit controller communication wiring terminals. See Figure 6 on page 7 for wiring details. If the supplied cable wire is not long enough for your installation, a standard modular cable of the correct length can be purchased through WattMaster and one of the modular connectors can be cut off to allow for the transformer and communication terminal wiring connections. It is recommended that you do not splice the communications wire if at all possible. The transformer should be rated at 6 VA minimum power output.
Interfaces Overview

Power/Comm Board Wiring

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

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

If Desired, Instead Of Using A Power/Comm Cable, You Can Use 2 Conductor Twisted Pair With Shield Cable To Connect To The Power/Comm Board From The SA Controller, MiniLink PD, Or Another Power/Comm Board. See Figure 4 For Cable Specifications.

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. See Figure 4 For Wiring When Power/Comm Board Is Used For Connection Of MiniLink Polling Devices On The Network Loop.

Figure 5: Typical Power/Comm Board Wiring
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.

Modular System Manager Back of Front Cover

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)

Class 2 Transformer Rated for 6 VA Minimum

Figure 6: Modular System Manager - Stand Alone
Operator Interfaces Comparison

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

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

Display Screens & Data Entry Keys

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

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

Both the System Manager and Modular Service Tool are provided with “Mode Selection Buttons.” These buttons give you instant access to the specific mode desired without having to scroll through several menu screens to get there. The Modular Service Tool has two extra function keys (“Configuration” and “Balance-Test”) that are not available on the System Manager.

<table>
<thead>
<tr>
<th>Button Description</th>
<th>Mode Selection Buttons (System Manager)</th>
<th>Mode Selection Buttons (Modular Service Tool)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
<td>Pressing this button takes you directly to the controller “Status” screens.</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 and “Configuration” menu.</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>
<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 “Overridess” screen. See the “Override Button” section on page 12 for a description of this function. See Notes 1 &amp; 2 below.</td>
<td>Pressing this button takes you directly to the controller “Override” screen. See the “Override Button” section on page 14 for a description of this function. See Note 1 below.</td>
</tr>
<tr>
<td>ALARMS</td>
<td>Pressing this button takes you directly to the controller “Alarms” screen. See the “Alarms Button” section on page 11 for a description of this function. See Notes 1 &amp; 2 below.</td>
<td>Pressing this button takes you directly to the controller “Alarms” screen. See the “Alarms Button” section on page 13 for a description of this function. See Note 1 below.</td>
</tr>
<tr>
<td>CONFIGURATION</td>
<td>Not Available. Use “Setpoints” Button to access Menu.</td>
<td>Pressing this button takes you directly to the controller “Configuration” screens.</td>
</tr>
<tr>
<td>BALANCE-TEST</td>
<td>Not available.</td>
<td>Pressing this button takes you directly to the controller “Balance-Test” screens.</td>
</tr>
</tbody>
</table>

Service Tool and System Manager

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

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

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

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

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

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

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

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

Notes:

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

(2) The “Search for Units” function must be performed on the System Manager upon initial system setup before this function will be available. See the “System Manager NM & MM Loop Search” section of this manual for complete instructions on performing a loop search.
Modular System Manager

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

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

Configuring for Stand-Alone Mode, Multiple System Managers Mode, or Network Mode
The System Manager must be configured for the correct mode of operation for your system. There are 3 modes of operation available for the Orion System—Stand-Alone, Multiple MGRS, and Network Mode. Look at the bottom line of the display as mentioned in the previous paragraph and determine which mode your System Manager is currently set for. If you are using this System Manager on a communications loop that doesn’t have a MiniLink PD or CommLink connected to it and you have a single System Manager on your system, then you need to operate in Stand-Alone Mode. The first two characters on the bottom line of the display should be SA. If you are using this System Manager on a communications loop, have a MiniLink PD or CommLink installed, and have multiple System Managers on your system, then you need to operate in Multiple MGRS Mode. The first two characters on the bottom line of the display should be MM. If you are using this System Manager on a communications loop that has a MiniLink PD or CommLink installed and you have a single System Manager for your entire system, then you need to operate in Network Mode. The first two characters on the bottom line of the display should be NM.

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

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

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

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

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

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

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

For Stand Alone Mode, press <0>.

For Multiple MGRS Mode, enter the address at which you want this particular System Manager to be set. When multiple System Managers are used on a local loop, each must be set with a unique address different from any other device on that loop. You must perform this same operation again for each System Manager installed. If you want one of these System Managers to be able to indicate alarms and overrides for the entire system, you must enter <63> for Network Mode on that particular System Manager.

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

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

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

Press any key on the keyboard to exit this screen.
**System Manager NM & MM Mode Loop Search**

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

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

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

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

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

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

Press `<2>` for Loop Search. The following screen will be displayed:

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

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

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

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

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

**System Manager Alarm Search**

The System Manager can be used to search for all active alarms on the system. You must configure the MiniLink PD to allow for “Alarm Polling” for each controller you want polled for alarms. See the MiniLink PD programming section on page 55 of this manual for setting information. Press `<Alarm>`. The *Unit Selection Screen* below will be displayed.

Enter the Unit ID of any unit on the system and press `<Enter>`. The alarm search will begin with the unit you enter. The entire system is searched from this point.

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

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

```
Alarm Screen
SEARCHING!
```

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

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

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

### System Manager Passcodes

**System Manager Override Search**

When a space sensor with override option is used with any VAV/Zone Controller or SA Controller, the System Manager can determine and report any controllers that are currently operating in an override condition. This function requires that a MiniLink Polling Device is installed on each loop where the controllers may be located. The MiniLink PD must be configured to allow for “Alarm Polling” for each controller that Override Polling Enabled is desired for this function to work. See the MiniLink PD programming section on page 55 of this manual for setting information.

To access the *Space Sensor Overrides Screen*, press `<Overrides>`, located on the System Manager keypad. A screen will appear asking you to enter a unit ID. *Enter* an ID for any active controller on the system and press `<Enter>`. The following screen will appear:

![Overrides Screen SEARCHING!](image)

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

**Overrides Screen**

Loop = 1  Unit = 59
Override Unit

**System Manager Passcodes**

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

![THIS ACTION REQUIRES PASSCODE CLEARANCE](image)

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

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

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

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

![1) Set Time & Date
2) Communications
->) Next Menu
ESC) Exit Menu](image)

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

![1) Change Passcodes
2) Loop Search
<-) Prev. Menu
ESC) Exit Menu](image)

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

![Enter New Passcode
Level 1.....: XXXX
Level 2.....: XXXX
[Must Be 4 Digits]](image)

This screen allows you to enter new Level 1 or Level 2 passcodes. The actual digits in your passcodes are never displayed. An “X” is used as a place holder for each digit entered. Passcodes must always be four digits in length, so the usable range of numbers is 1000 to 9999.

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

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

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

Modular Service Tool Initialization Screen

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

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

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

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

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

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

Press <2> to access the Communications Screen.

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

You Have Changed The Service Tool Mode
Press Any Key To Continue

Modular Service Tool Alarm Search

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

Unit Selection
Enter Unit ID#
Selected ID#: XXXX

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

Alarm Screen
SEARCHING!

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

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

To clear any alarms that are found, you must fix the problem indicated in the alarm. Once the problem is fixed, the alarm will clear from the screen the next time the unit is polled.
Modular Service Tool Override Search
When a space sensor with override option is used with any VAV/Zone Controller or SA Controller, the Modular Service Tool can determine and report any controllers that are currently operating in an override condition on the local loop whose ID (Address) has been entered before running the search. This function requires that a MiniLink Polling Device is installed on each loop where the controllers may be located.

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

![Overrides Screen]

SEARCHING!

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

![Overrides Screen]

Loop = 1  Unit = 59  Override Unit

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

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

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

![Energy Saving]

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

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

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

VAV Unit

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

**Configuration Section**

- Screen #1—Duct Static Pressure Control = “YES”
- Screen #3—HVAC Mode Enable = “Supply Air”
- Screen #4—HVAC Reset Source = “No Reset”
  Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.
- Screen #9—Entering Air Humidity Sensor = “YES”
  Only if equipped with an Entering Air Humidity Sensor for Control of Economizer.
- Screen #12—Water Side Economizer Control = “YES”
  Only if equipped with a Water Side Economizer.
- Screen #14—Proof of Flow Input = “YES”
  Only if equipped with a Proof of Flow switch.
- Screen #28—Emergency Shutdown Input = “YES”
  Only if a Smoke Detector, Firestat, or other Shutdown device is connected to the SA.

Screens #29 through #34 = “YES”

Only needed when connected to Orion VAV/Zone Controllers.

Screens #41 through #60 = Refer to the AAON® wiring diagram inside the unit before configuring on-board and expansion board relays.

CAV Unit

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

**Configuration Section**

- Screen #1—Duct Static Pressure Control = “NO”
- Screen #2—Supply Fan Cycle Mode = “NO”
  Only configure as “YES” if the Supply Fan needs to be off when no Heating, Cooling, or Dehumidification demand exists.
- Screen #3—HVAC Mode Enable = “Space Temperature”
  For cooling-only VAV units, select “Supply Air.”
- Screen #4—HVAC Reset Source = “No Reset”
  Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.
- Screen #6—Dehumidification Control = “YES”
  Only if the unit is equipped for Dehumidification.
- Screen #7—Dehumidification Priority = “YES”
- Screen #8—Dehumidification Unoccupied = “YES”
  Only if Dehumidification is needed during the Unoccupied Mode.
- Screen #9—Entering Air Humidity Sensor = “YES”
  Only if equipped with an Entering Air Humidity Sensor for Control of Economizer.
- Screen #10—Indoor Humidity Sensor = “YES”
  Only if equipped with an Indoor Humidity Sensor for Dehumidification.
- Screen #12—Water Side Economizer Control = “YES”
  Only if the unit is equipped with a Water Side Economizer.
- Screen #14—Proof of Flow Input = “YES”
  Only if equipped with a Proof of Flow Switch.
- Screen #28—Emergency Shutdown Input = “YES”
  Only if a Smoke Detector, Firestat, or other Shutdown device is connected to the SA Controller.

Screens #41 through #60 = Refer to the AAON® wiring diagram inside the unit before configuring on-board and expansion board relays.
MUA and Heat Pump Configurations

**MUA Unit**

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

**Configuration Section**

- **Screen #1**—Duct Static Pressure Control = “NO”
- **Screen #3**—HVAC Mode Enable = “Entering Air”
- **Screen #4**—HVAC Reset Source = “No Reset”
  
  Can be configured for Reset; see the Supply Air Setpoint Reset section that follows before configuring.
  
- **Screen #6**—Dehumidification Control = “YES”
  
  Only if the unit is equipped for Dehumidification.
  
- **Screen #7**—Dehumidification Priority = “YES”
  
- **Screen #8**—Dehumidification Unoccupied = “NO”
  
- **Screen #9**—Entering Air Humidity Sensor = “YES”
  
  Only if equipped with an Entering Air Humidity Sensor for Dehumidification.
  
- **Screen #14**—Proof of Flow Input = “YES”
  
  Only if equipped with a Proof of Flow Switch.
  
- **Screen #28**—Emergency Shutdown Input = “YES”
  
  Only if a Smoke Detector, Firestat, or other Shutdown device is connected to the SA Controller.

- Screens #41 through #60 = Refer to the AAON® wiring diagram inside the unit before configuring onboard and expansion board relays.

**Heat Pump**

Heat Pumps can be configured as VAV, CAV, or MUA. Configuration Screens #26 and #27 are used to configure the Heat Pump. A Relay Output must be configured for a Reversing Valve on Screens #41 through #60 whether the Reversing Valve is to be activated during Heating or Cooling operation. When using AAON® equipment, if the equipment is an AAON® packaged unit, the Reversing Valve activates during Heating operation.

**Configuration Section**

- **Screen #26**—Heat Pump Control = “YES”
  
- **Screen #27**—Reversing Valve Active During Heat/Cool = “0=Heat” if the Reversing Valve should energize for Heating operation; “1=Cool” if the Reversing Valve should energize for Cooling operation.

- Screens #41 through #60 = Refer to the AAON® wiring diagram inside the unit before configuring onboard and expansion board relays.
SA Controller Configuration Screen Index

The available Configuration Screens for the SA Controller are listed on the next few pages by sequential screen number. When each SA 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 SA 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 SA Controller 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  Entering Air Humidity Sensor
Screen #10  Indoor Air Humidity Sensor
Screen #11  Heat During Dehumidify
Screen #12  Water Side Economizer Control
Screen #13  Water Side is Variable
Screen #14  Proof of Flow Input
Screen #15  Modulating Cooling/Heating
Screen #16  Modulating Heat Output Signal
Screen #17  Modulating Heat Reverse Acting
Screen #18  Modulating Heat Proportional Window
Screen #19  Chilled Water Output Signal
Screen #20  Digital Compressor Signal
Screen #21  Modulating Cooling Reverse Acting
Screen #22  Modulating Cool Proportional Window
Screen #23  Water Cooled Condenser or WSHP Module Installed
Screen #24  Head Pressure Module Installed
Screen #25  Mult Digital Comp Installed
Screen #26  Heat Pump Control
Screen #27  Reversing Valve Active For Heat/Cool
Screen #28  Emergency Shutdown Input
Screen #29  Broadcast Supply Temperature
Screen #30  Broadcast Status Fan & Heat
Screen #31  Broadcast Internal Time Clock
Screen #32  Broadcast Internal Schedule
Screen #33  Broadcast VAV Boxes Force to Max
Screen #34  Broadcast VAV Boxes Force to Fixed
Screen #35  1 HVAC Unit w/Boxes on Multiple Loops
Screen #36  Unit Uses R410A Refrigerant
Screens #37-40  Cooling & Heating Staging Delays
Screen #41-60  Relay Configuration Screens
Programming

SA Controller Configuration Screens

Configuration Screens

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

System Manager Instructions

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

Press <2> to enter Configuration Screen #1.

Modular Service Tool Instructions

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

Configuration Screen #1 - Duct Static Pressure Control

SA Unit Cnfg ID 102
Duct Static Pressure Control: YES
[0=NO 1=YES]

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

Configuration Screen #2 - Supply Fan Cycle

SA Unit Cnfg ID 102
Supply Fan Cycle Mode: NO
[0=NO 1=YES]

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

Configuration Screen #3 - HVAC Mode Enable

SA Unit Cnfg ID 102
HVAC Mode Enable
Supply Air
Press “0” to Change

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

- **Supply Air**
  This is typical for VAV applications. Occupied Cooling with Morning Warm-up.
- **Entering Air**
  This is for 100% Outdoor Air (MUA) units. Dehumidification utilizes a Dewpoint Calculation if equipped with an Entering 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.

Configuration Screen #4 - HVAC Reset Source

SA Unit Cnfg ID 102
HVAC Reset Source
No Reset
Press “0” to Change

The Supply Air Heating and Cooling Temperature Setpoints can be reset using various input sources. Default is No Reset. Enter <0> to change/select the desired Reset Source for Supply Air Temperature Reset. If you select No Reset, then neither the Supply Air Setpoint nor the Supply Fan VFD Reset will occur. The selections are:

- **No Reset**
- **Fan VFD Percentage**
- **Entering Air**
- **Space Temperature**
- **Remote Reset Signal**

Configuration Screen #5 - Reset Interval Rate

SA Unit Cnfg ID 102
Reset Interval Rate...: 20 s
[1-255 Seconds]

If you selected Space 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

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehumidification</td>
</tr>
<tr>
<td>Control: NO</td>
</tr>
<tr>
<td>[0=NO 1=YES]</td>
</tr>
</tbody>
</table>

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

### Configuration Screen #7 - Dehumidification Priority

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehumidification</td>
</tr>
<tr>
<td>Priority: NO</td>
</tr>
<tr>
<td>[0=NO 1=YES]</td>
</tr>
</tbody>
</table>

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

### Configuration Screen #8 - Dehumidification Unoccupied

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehumidification Unoccupied: NO</td>
</tr>
<tr>
<td>[0=NO 1=YES]</td>
</tr>
</tbody>
</table>

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

### Configuration Screen #9 - Entering Air Humidity Sensor

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entering Humidity Sensor: NO</td>
</tr>
<tr>
<td>[0=NO 1=YES]</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Humidity Sensor: NO</td>
</tr>
<tr>
<td>[0=NO 1=YES]</td>
</tr>
</tbody>
</table>

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

### Configuration Screen #11 - Heat During Dehumidify

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat During Dehumidify: NO</td>
</tr>
<tr>
<td>[0=NO 1=YES]</td>
</tr>
</tbody>
</table>

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

### Configuration Screen #12 - Water Side Economizer Control

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Side Economizer Control: NO</td>
</tr>
<tr>
<td>[0=NO 1=YES]</td>
</tr>
</tbody>
</table>

Enter <1> for YES if the SA Controller is controlling the Water Side Economizer. Enter <0> for NO. Default is NO.

### Configuration Screen #13 - Water Side is Variable

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Side is Variable: NO</td>
</tr>
<tr>
<td>[0=NO 1=YES]</td>
</tr>
</tbody>
</table>

Enter <1> for YES if the Water Side Economizer has Variable Flow. Enter <0> for Constant Flow. Default is NO.
# Programming

## SA Controller Configuration Screens

### Configuration Screen #14 - Proof of Flow Input

**SA Unit Cnfg ID 102**

**Proof Of Flow**

**Input:** NO

**[0=NO 1=YES]**

*Enter <1> for YES if the unit is equipped with a Proof of Flow Switch and it is connected to the SA Controller. If selected as YES and the Proof of Flow Switch is open, only the Supply Fan Relay will be active. If any other relays such as Heating Stages or Cooling Stages are active, they will be deactivated when the Proof of Flow Switch input is lost. Enter <0> for NO. Default is NO.*

### Configuration Screen #15 - Modulating Cooling/Heating

**SA Unit Cnfg ID 102**

**Mod Cooling:** NO

**Mod Heating:** NO

**[0=NO 1=YES]**

*Enter <1> for YES if the HVAC unit is controlling Modulating Heating or Modulating Cooling or both. If your HVAC unit is going to use a Modulating Chilled Water Valve or is equipped with a Digital Compressor, you must select YES for Modulating Cooling. If your HVAC is using a Modulating Hot Water Valve, Modulating Steam Valve, or a SCR Controlled Electric Heater, you must select YES for Modulating Heating. Enter <0> for NO. Default is NO.*

### Configuration Screen #16 - Modulating Heating Output Signal

**SA Unit Cnfg ID 102**

**Mod Heating Output Signal:** 0

**[0=0-10V 1=2-10V]**

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

### Configuration Screen #17 - Modulating Heating Reverse Acting

**SA Unit Cnfg ID 102**

**Mod Heating Rev Acting:** NO

**[0=NO 1=YES]**

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

### Configuration Screen #18 - Modulating Heating Proportional Window

**SA Unit Cnfg ID 102**

**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 #19 - Chilled Water Output Signal

**SA Unit Cnfg ID 102**

**Chilled Water Output Signal:** 0

**[0= 0-10V 1= 2-10V]**

*Enter <1> for a 2-10 VDC signal or <0> for a 0-10 VDC signal to a Chilled Water Valve for Modulating Cooling Stage 1. If using a Digital Compressor, select <YES> on the next screen. Default is 0-10V.*

### Configuration Screen #20 - Digital Compressor Signal

**SA Unit Cnfg ID 102**

**Digital Compressor Signal 1-5V :** NO

**[0=NO 1=YES]**

*Enter <1> for YES if the HVAC unit is equipped with a Digital Compressor for Modulating Cooling Stage 1 or 2. Enter <0> for NO. Default is NO.*
Configuration Screen #21 - Modulating Cooling Reverse Acting

SA Unit Cnfg ID 102
Mod Cooling
Rev Acting: NO
[0=NO 1=YES]

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

Configuration Screen #22 - Modulating Cooling Proportional Window

SA Unit Cnfg ID 102
Mod Cooling
Prop. Window.: 10º 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 ºF 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 10ºF and 30 seconds.

Configuration Screen #23 - Water Cooled Condenser or WSHP Module Installed

SA Unit Cnfg ID 102
Water Cooled Condenser: NO
[0=NO 1=YES]

Enter <1> for YES if your unit has a Water Cooled Condenser or if you have a Water Source Heat Pump (WSHP) Module installed. Enter <0> for NO. Default is NO.

Configuration Screen #24 - Head Pressure Control

SA Unit Cnfg ID 102
Head Pressure Control: NO
[0=NO 1=YES]

Enter <1> for YES if you have a Head Pressure Module installed. Enter <0> for NO.

Configuration Screen #25 - Multiple Digital Compressors Installed

SA Unit Cnfg ID 102
Mult Digital Comp Installed: NO
[0=NO 1=YES]

Enter <1> for YES if you have multiple Digital Scroll Compressors installed. Enter <0> for NO. Default is NO.

Configuration Screen #26 - Heat Pump Control

SA Unit Cnfg ID 102
Heat Pump Control: NO
[0=NO 1=YES]

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

Configuration Screen #27 - Reversing Valve Active During Heat/Cool

SA Unit Cnfg ID 102
Rev. Valve Active For: Cool
[0=Heat 1=Cool]

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

**SA Controller Configuration Screens**

**Configuration Screen #28 - Emergency Shutdown Input**

SA Unit Cnfg ID 102
Emergency Shutdown Input: NO
[0=NO 1=YES]

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

**Configuration Screen #29 - Broadcast Supply Temperature**

SA Unit Cnfg ID 102
Broadcast Supply Temperature: YES
[0=NO 1=YES]

*This broadcast sends the SA Controller’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 SA Controller with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate. Enter <1> for YES or <0> to NO. Default is NO.*

**Configuration Screen #30 - Broadcast Status Fan & Heat**

SA Unit Cnfg ID 102
Broadcast Status Fan & Heat: NO
[0=NO 1=YES]

*This broadcast sends the SA Controller’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 SA Controller with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate. Enter <1> for YES or <0> for NO. Default is NO.*

**Configuration Screen #31 - Broadcast Internal Time Clock**

SA Unit Cnfg ID 102
Broadcast Internal Time Clock: NO
[0=NO 1=YES]

*This broadcast sends the time from the SA Controller’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 SA Controller with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate, but can also be used to synchronize all controllers on the local loop. Enter <1> for YES or <0> for NO. Default is NO.*

**Configuration Screen #32 - Broadcast Internal Schedule**

SA Unit Cnfg ID 102
Broadcast Internal Schedule: NO
[0=NO 1=YES]

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

**Configuration Screen #33 - Broadcast VAV Boxes Force to Max**

SA Unit Cnfg ID 102
Broadcast VAV Boxes Force To Max: YES
[0=NO 1=YES]

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

**Configuration Screen #34 - Broadcast VAV Boxes Force to Fixed**

```
SA Unit Cnfg ID 102
Broadcast VAV Boxes
Force To Fixed: NO
[0=NO  1=YES]
```

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

**Configuration Screen #35 - 1 HVAC Unit with Boxes on Multiple Loops**

```
SA Unit Cnfg ID 102
1 HVAC Unit w/ Boxes
On Multi. Loops: NO
[0=NO  1=YES]
```

Enter <1> for YES to have all broadcasts that have been configured on Configuration Screens 29 through 34 sent to all local loops on the entire system, not just the local loop the SA 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 SA Controller with VAV/Zone Controllers on multiple loops. Other SA Controllers or add-on devices may be connected but no other SA Controllers with VAV/Zone Controllers can be connected on the system. Enter <0> for NO. Default is NO.

**Configuration Screen #36 - Uses R410A Refrigerant**

```
SA Unit Cnfg ID 102
Unit Uses R410A Refrigerant: YES
[0=NO  1=YES]
```

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

**Configuration Screens #37-40 - Cooling & Heating Stage Delays**

```
SA Unit Cnfg ID 102
Cooling Stage Delays
Staging Up...: 3 Min
Staging Down : 1 Min

SA Unit Cnfg ID 102
Cooling Stage Delays
Min Run Time: 5 Min
Min Off Time: 3 Min

SA Unit Cnfg ID 102
Heating Stage Delays
Staging Up...: 3 Min
Staging Down : 1 Min

SA Unit Cnfg ID 102
Heating Stage Delays
Min Run Time: 2 Min
Min Off Time: 1 Min
```

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

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

See the Sequence of Operation Manual for information on how these Delays and Run Times are used.

<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>
Programming

SA Controller Configuration Screens

Configuration Screens #41-60 - Relay Configuration Screens

<table>
<thead>
<tr>
<th>SA Unit Cnfg ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay Configurations</td>
</tr>
<tr>
<td>Rly xx: Not Used</td>
</tr>
<tr>
<td>Press “0” To Change</td>
</tr>
</tbody>
</table>

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
- WS Economizer
- HGR

Relays #2 through #21 can be individually configured. By using the 4 relay outputs available on the SA Controller, the 4 relays on the SA 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.”
Setpoints - General Procedures

System Manager Instructions
From any menu screen, press <Setpoints>. The Unit Selection Screen will appear requesting that you enter the unit ID number. Enter the correct unit ID number of the SA Controller you want to change Setpoints for and press <Enter>. You will see the screen shown below.

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

Modular Service Tool Instructions
From any menu screen, press <Setpoints>. The Unit Selection Screen will appear requesting that you enter the unit ID number. Enter the correct unit ID number of the SA Controller you want to change Setpoints for and press <Enter>. You will then see Setpoint Screen #1.

Setpoint Screen Index
The available Setpoint Screens for the SA Controller are listed on the next few pages by sequential screen number. When each SA 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 SA 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 SA Controller Setpoint Screens in numerical order with a brief listing of the Setpoint feature available on each screen:

Setpoint Screen #1 HVAC Mode Setpoints
Setpoint Screen #2 HVAC Mode Select Deadband
Setpoint Screen #3 Unoccupied Setbacks
Setpoint Screen #4 SAT Cooling Setpoints
Setpoint Screen #5 Cool Reset Source Setpoints
Setpoint Screen #6 SAT Heating Setpoints
Setpoint Screen #7 Heat Reset Source Setpoints
Setpoint Screen #8 Stage Control Window
Setpoint Screen #9 Entering Air Lockouts
Setpoint Screen #10 Cutoff Temperatures Lo SAT & Hi SAT
Setpoint Screen #11 Minimum Supply Fan VFD Speed For Heating
Setpoint Screen #12 Morning Warm-up Target Temp & Max Length
Setpoint Screen #13 Dehumidification Indoor RH & Entering Air Dewpoint
Setpoint Screen #14 Dehumidification Coil Temperature
Setpoint Screen #15 Cooling Head Pressure Setpoint
Setpoint Screen #16 Reheat Head Pressure Setpoint
Setpoint Screen #17 Head Pressure Output Minimum Position Setpoint
Setpoint Screen #18 Water Side Economizer Setpoints
Setpoint Screen #19 Static Setpoint, Deadband, and Control Rate
Setpoint Screen #20 Fan Starting Delay Timer
Setpoint Screen #21 Mechanical Heat Cool Failures Occur After No Change For
Setpoint Screen #22 Preheat/Low Ambient Temperature
Setpoint Screen #23 HVAC Schedule
Setpoint Screen #24 Push-Button Override Duration
Setpoint Screen #25 HVAC Mode Sensor Slide Offset
Setpoint Screen #26 Heat Pump Auxiliary Heating Offset
Setpoint Screen #27 Heat Pump Defrost Temp and Defrost Timer
Setpoint Screen #28 Adaptive Defrost Adjustment
Setpoint Screen #29 Internal Schedule Optimal Start Soak Multiplier
Setpoint Screen #30 Trend Log Interval
Setpoint Screen #31 Sensor Calibration For SPC & SAT
Setpoint Screen #32 Sensor Calibration For EAT & EWT
Setpoint Screen #33 Sensor Calibration For Coil
Programming

SA Controller Setpoint Screens

Setpoint Screen #1 - HVAC Mode Setpoints

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Mode Setpoints</td>
<td>Cooling</td>
<td>0°F</td>
<td>75°F</td>
</tr>
<tr>
<td>HVAC Mode Setpoints</td>
<td>Heating</td>
<td>0°F</td>
<td>70°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #2 - HVAC Mode Select Deadband

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Mode Select Deadband</td>
<td>0°F</td>
<td>1°F</td>
<td>10°F</td>
</tr>
</tbody>
</table>

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>Cooling</td>
<td>0°F</td>
<td>30°F</td>
</tr>
<tr>
<td>Unoccupied Setbacks</td>
<td>Heating</td>
<td>0°F</td>
<td>30°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #4 - SAT Cooling Setpoints

If no Reset Source has been configured in Configuration Screen #4, then this setpoint will be the Supply Air Temperature Cooling Setpoint. Line 4 will be blank. If a Reset Source has been configured in Configuration Screen #4, then Line 4 will read Rst Limit. Reset is always upward from the SAT setpoint to the Reset Limit setpoint. So, the SAT will be the lowest temperature the Supply Air Setpoint can be reset to and Reset Limit will be the highest temperature the Supply Air Setpoint can be reset to. The Cooling Supply Air Temperature Setpoint will automatically be reset warmer or colder within this range as the Reset Source (next screen) moves within its range.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT Cooling Setpoint</td>
<td>30°F</td>
<td>55°F</td>
<td>80°F</td>
</tr>
<tr>
<td>Cooling Reset Limit</td>
<td>40°F</td>
<td>55°F</td>
<td>200°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #5 - Cool Reset Source

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

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

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

**Space Temperature Cool Reset:**
- Space Temperature (SPC Hi) = 75ºF, SAT Setpoint (SAT) = 55ºF
- Space Temperature (SPC Lo) = 74ºF, SAT Setpoint (Rst) = 65ºF

**VFD Percentage Cool Reset:**
- VFD Percentage (VFD) = 70%, SAT Setpoint (SAT) = 55ºF
- VFD Percentage (VFD) = 30%, SAT Setpoint (Rst) = 65ºF

**Input Voltage Cool Reset:**
- Input Voltage (VLT) = 0 Volts, SAT Setpoint (SAT) = 55ºF
- Input Voltage (VLT) = 10 Volts, SAT Setpoint (Rst) = 65ºF

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

**Setpoint Screen #6 - SAT Heating Setpoints**

If no Reset Source has been configured in Configuration Screen #4, then this setpoint will be the Supply Air Temperature Heating Setpoint. Line 4 will be blank. If a Reset Source has been configured in Configuration Screen #4, then Line 4 will read Rst Limit. Reset is always upward from the SAT Setpoint to the Rst Limit setpoint. So, the SAT will be the lowest temperature the Supply Air Setpoint can be reset to and Reset Limit will be the highest temperature the Supply Air Setpoint can be reset to. The Heating Supply Air Temperature Setpoint will automatically be reset warmer or colder within this range as the Reset Source (next screen) moves within its range.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT Heating Spt</td>
<td>30ºF</td>
<td>120ºF</td>
<td>200ºF</td>
</tr>
<tr>
<td>Reset Limit Spt</td>
<td>40ºF</td>
<td>120ºF</td>
<td>200ºF</td>
</tr>
</tbody>
</table>

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

**Space Temperature Heat Reset:**
- Space Temperature (SPC Hi) = 71ºF, SAT Setpoint (SAT) = 90ºF
- Space Temperature (SPC Lo) = 70ºF, SAT Setpoint (Rst) = 120ºF

**VFD Percentage Heat Reset:**
- VFD Percentage (VFD) = 30%, SAT Setpoint (SAT) = 90ºF
- VFD Percentage (VFD) = 70%, SAT Setpoint (Rst) = 120ºF

**Input Voltage Heat Reset:**
- Input Voltage (VLT) = 0 Volts, SAT Setpoint (SAT) = 90ºF
- Input Voltage (VLT) = 10 Volts, SAT Setpoint (Rst) = 120ºF

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

SA Controller Setpoint Screens

Setpoint Screen #8 - Stage Control Window

SA Unit Spts ID 102
Stage Control Window
Cooling.........: 5°F
Heating.........: 5°F

When the SA 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</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>1°F</td>
<td>5°F</td>
<td>20°F</td>
</tr>
<tr>
<td>Heating</td>
<td>1°F</td>
<td>5°F</td>
<td>20°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #9 - Entering Air Lockouts

SA Unit Spts ID 102
Entering Air Lockouts
Cooling.......: 50°F
Heating.......: 70°F

The SA Controller will Lockout Mechanical Heating or Cooling when the Entering Air Temperature is above or below these Setpoints.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA Lockouts Cooling</td>
<td>0°F</td>
<td>50°F</td>
<td>100°F</td>
</tr>
<tr>
<td>EA Lockouts Heating</td>
<td>35°F</td>
<td>70°F</td>
<td>150°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #10 - Cutoff Temperature

SA Unit Spts ID 102
Cutoff Temperatures
Lo SAT.......: 40°F
Hi SAT.......: 170°F

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

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

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

SA Unit Spts ID 102
Minimum Supply Fan VFD Speed For Heating..: 30%

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

<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>

Setpoint Screen #12 - Morning Warm Up Temp

SA Unit Spts ID 102
Morning Warm Up
Target Temp: 72°F
Max Length.: 60 Min

When the SA Controller is configured for VAV operation and the controller enters the Occupied Mode, the SA Controller looks at the Entering Air Temperature to determine if the unit should initiate Morning Warm-up Mode. If the Entering Air Temperature is below the Morning Warm-up Target Temperature and the Max Length is greater than “0,” the SA Controller will initiate Heating. This is considered Morning Warm-up and will run until the Entering 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>
On VAV configured units that are not using 100% Outdoor Air, when the Indoor Relative Humidity percentage rises above the Indoor RH Setpoint, the unit will start operating in Dehumidification Mode.

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

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehumidification Setpoint</td>
<td>1%</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>Indoor RH</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entering Dp.</td>
<td>55°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dehumidification Setpoint</td>
<td>35°F</td>
<td>55°F</td>
<td>80°F</td>
</tr>
<tr>
<td>OA Dewpoint</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the Dehumidification Mode, the SA Controller uses the calculated Coil Temperature to activate DX Cooling based on this Dehumidification Coil Temperature Setpoint. The SA 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 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</td>
<td>35°F</td>
<td>45°F</td>
<td>70°F</td>
</tr>
<tr>
<td>Temperature Setpoint</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you are using the Head Pressure Module, this is the Cooling Setpoint for control of the condenser fan speed. This is based on the highest head pressure reading of up to 4 Head Pressure Sensors. See the Two Condenser Head Pressure Module Technical Guide for detailed information.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Head Pressure</td>
<td>250 PSI</td>
<td>291 PSI</td>
<td>400 PSI</td>
</tr>
<tr>
<td>Setpoint</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you are using the Head Pressure Module, this is the Reheat Setpoint for control of the condenser fan speed during dehumidification. This is based on the highest head pressure reading of up to 4 Head Pressure Sensors. See the Two Condenser Head Pressure Module Technical Guide for detailed information.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reheat Head Pressure</td>
<td>250 PSI</td>
<td>395 PSI</td>
<td>400 PSI</td>
</tr>
<tr>
<td>Setpoint</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Programming

### SA Controller Setpoint Screens

#### Setpoint Screen #17 - Head Pressure Output

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Pressure Output Minimum Position Setpoint</td>
<td>0%</td>
<td>35%</td>
<td>100%</td>
</tr>
</tbody>
</table>

This is the minimum position the Condenser Water Valve or the Condenser Fan will be allowed to modulate down to when the compressors are active. This will ensure adequate water flow or airflow during compressor cooling operation. For a Water Cooled Condenser, a proper setting will prevent the Water Flow Switch from opening which would create a proof of water flow Failure.

#### Setpoint Screen #18 - Water Side Economizer Setpoints

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Side Econo Delta Spt</td>
<td>3°F</td>
<td>10°F</td>
<td>20°F</td>
</tr>
<tr>
<td>Water Side Econo Deadband</td>
<td>2°F</td>
<td>2°F</td>
<td>10°F</td>
</tr>
</tbody>
</table>

If an Entering Air Humidity Sensor is not connected to the SA Controller and the Entering Air Temperature falls below the Delta Setpoint, the Economizer can be used for Free Cooling. If an Entering Air Humidity Sensor is connected to the SA Controller, then a Wetbulb Temperature will be calculated and used instead of the Entering Air Drybulb Temperature to determine when Free Cooling can be used.

#### Setpoint Screen #19 - Static Setpoint, Deadband & Control Rate

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Spt</td>
<td>0.50”</td>
<td>0.50”</td>
<td>3.00”</td>
</tr>
<tr>
<td>Deadband</td>
<td>0.10”</td>
<td>0.10”</td>
<td>1.00”</td>
</tr>
<tr>
<td>Control Rate</td>
<td>10 s</td>
<td>10 s</td>
<td>30 s</td>
</tr>
</tbody>
</table>

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.
Programming

SA Controller Setpoint Screens

Setpoint Screen #20 - Supply Fan Starting Delay Timer

This is the Supply Fan Starting Delay Timer initiated whenever the SA Controller initiates Supply Fan operation. This is useful when you are using multiple SA-controlled HVAC units and want to be sure that all the units do not start at exactly the same time when the Occupied schedule occurs. Each SA Controller should be set with staggered Fan Starting Delay Timer Setpoint values. When the 255 Second default setpoint is used, it multiplies each SA Controller’s address by 5 and uses this value in seconds as the Fan Starting Delay Time. This provides a staggered start for each SA Controller on the system without having to individually set each SA Controller for its own time delay.

<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 Setpoint time period, a Mechanical Heating or Cooling failure alarm will be generated. The Alarm is for Status Reporting only. The HVAC unit will continue to run.

<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 SA Relay Outputs must be configured for the Pre-Heater control. When configured, if the Entering Air Temperature falls below the Low EAT Ambient Protection Temperature Setpoint and the HVAC unit is in Occupied Mode, the Pre-Heater relay will activate.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat/Low Ambient Temperature</td>
<td>0°F</td>
<td>0°F</td>
<td>100°F</td>
</tr>
</tbody>
</table>

Setpoint Screen #23 - HVAC Schedule

The SA Controller has an Internal Scheduler. If you want the SA Controller 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>
<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>
Programming

SA Controller Setpoint Screens

Setpoint Screen #24 - Push-Button Override Duration

If the SA 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>
<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 SA 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>0ºF</td>
<td>0ºF</td>
<td>10ºF</td>
</tr>
</tbody>
</table>

Setpoint Screen #26 - Heat Pump Auxiliary Heating Delay

If the SA 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 Pump Defrost Setpoints

The Defrost Temperature Setpoint is the Coil Suction Temperature at which the unit will go into Defrost Mode during Heat Pump Heating operation. This unit will operate in the Defrost Mode for 10 minutes or until the Head Pressure reaches 450 PSIG. The Defrost Timer determines the length of time between Defrost Modes. The length of the Defrost Timer can be automatically be adjusted by the Adaptive Defrost Adjustment described in Setpoint Screen #35. This Defrost Mode is only available if using the SA Controller and a Head Pressure Module. A Suction Pressure Transducer is also required. This screen does not appear if using the SA Controller and a WSHP Protection Module in a Water Source Heat Pump application.

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Default</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Pump Defrost Temp</td>
<td>0ºF</td>
<td>30ºF</td>
<td>50ºF</td>
</tr>
<tr>
<td>Heat Pump Defrost Timer</td>
<td>10 Min</td>
<td>30 Min</td>
<td>90 Min</td>
</tr>
</tbody>
</table>
Setpoint Screen #28 - Adaptive Defrost Adj. Setpoint

SA Unit Spts ID 102
Adaptive Defrost Adj. Setpoint: 0 MIN

Enter a value greater than zero to enable the Adaptive Defrost Adjustment of the Heat Pump Defrost Timer (Screen #27). This adjustment value will be subtracted from the Heat Pump Defrost Timer if the Defrost Mode lasts the entire 10 minutes. A proportion of this adjustment value will be added to the Heat Pump Defrost Timer if the Defrost Mode only lasts between 8 minutes and 0 minutes. This screen only applies if using the SA Controller and a Head Pressure Module. This screen does not appear if using the SA Controller and a WSHP Protection Module in a Water Source Heat Pump application.

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

Setpoint Screen #29 - Internal Schedule Optimal Start Soak Multiplier

SA Unit Spts ID 102
Internal Schedule Optimal Start Soak Multiplier: 0.0

The Internal Schedule Optimal Start Soak Multiplier Setpoint is a multiplier that if set to a number greater than 0 will be used as a multiplier for calculating the Optimal Start Time for the HVAC unit. This multiplier is only applied if the unit has been off for more than 24 hours. See the SA Controller Technical Guide for more detailed information regarding the Optimal Start. This multiplier is only applied if you are using the SA 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 #30 - Trend Log Interval

SA Unit Spts ID 102
Trend Log Interval: 15 MIN

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>120 Min</td>
</tr>
</tbody>
</table>

Setpoint Screen #31 - Sensor Calibration for SPC & SAT

SA Unit Spts ID 102
Sensor Calibration SPC: XX.X° 0.00°
Sensor Calibration SAT: XX.X° 0.00°

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

<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 #32 - Sensor Calibration for EAT & EWT

SA Unit Spts ID 102
Sensor Calibration EAT: XX.X° 0.00°
Sensor Calibration EWT: XX.X° 0.00°

If the Entering Air or Entering Water 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 Entering Air or Entering Water 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 EAT</td>
<td>-100.0°F</td>
<td>0.0°F</td>
<td>+100.0°F</td>
</tr>
<tr>
<td>Sensor Calibration EWT</td>
<td>-100.0°F</td>
<td>0.0°F</td>
<td>+100.0°F</td>
</tr>
</tbody>
</table>
Setpoint Screen #33 - Sensor Calibration for COIL

SA Unit Spts ID 102
Sensor Calibration
COIL: XX.Xº 0.00º

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.

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

You can access the SA Controller Scheduling Screens by pressing `<Schedule>` on either the System Manager or the Modular Service Tool. Press the number button for the scheduling function you wish to view.

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

**Week Schedules**

**Event #1**

SA Unit Schd ID 102
Sunday Event #1
Start Time...: XXXX
Stop Time....: XXXX

**Event #2**

SA Unit Schd ID 102
Sunday Event #2
Start Time...: XXXX
Stop Time....: XXXX

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

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

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

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

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

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

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

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

**Holiday Start/Stop Day Selection**

**SA Unit Hldy ID 102**

**Holiday # 1**

Start Mon/Day.: XXXX
[ July 4th = 704 ]

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
Programming
SA Controller Scheduling

Holiday Start/Stop Times

<table>
<thead>
<tr>
<th>SA Unit Hldy ID 102</th>
<th>Holiday Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Start Event #1: XXXX</td>
</tr>
<tr>
<td></td>
<td>Stop Event #1: XXXX</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SA Unit Hldy ID 102</th>
<th>Holiday Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Start Event #2: XXXX</td>
</tr>
<tr>
<td></td>
<td>Stop Event #2: XXXX</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>SA Unit Ovrd ID 102</th>
<th>Schedule Override</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enter Override...: X</td>
</tr>
<tr>
<td></td>
<td>[0=Auto 1=ON 2=OFF]</td>
</tr>
</tbody>
</table>

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

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

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

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

Setting Time & Date

Both the Modular Service Tool and Modular System Manager are equipped with a real time clock chip allowing them to maintain the correct time. Once you have programmed the correct time and date, the information is broadcast globally to all controllers on the entire system. The System Manager will also broadcast this information once every day at midnight to synchronize all of the controllers on the system.

Programming Times

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

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

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

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

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

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

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

Minutes - Enter the Minutes
(0 to 59)
Programming

Damper Force Modes

Programming the Date

<table>
<thead>
<tr>
<th>Program Time/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month (1-12): XX</td>
</tr>
<tr>
<td>Day (1-31): XX</td>
</tr>
<tr>
<td>Year (00-99): XX</td>
</tr>
</tbody>
</table>

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

Daylight Savings

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

- **Daylight Savings Auto Adjustment**: Yes
- **Use Left/Right Arrow**

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

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

Damper Force Modes

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

System Manager Instructions

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

1. **Change Setpoint**
2. **Configure Unit**
3. **Dampers Force**
   - **ESC** Exit Menu

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

Modular Service Tool Instructions

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

1. **Outputs Force**
2. **Dampers Force**
   - **ESC** Exit Menu

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

Dampers Force Mode Screen
If the unit ID you entered is for a SA 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 SA 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.

<table>
<thead>
<tr>
<th>Damper Force ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter Force Mode: 0</td>
</tr>
<tr>
<td>0=Auto 1=Open 2=Clsd</td>
</tr>
<tr>
<td>3=Max 4=Min 5=Fixed</td>
</tr>
</tbody>
</table>

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 48 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 48 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 49 for complete setpoint information.

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

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

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

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

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

If you entered the unit ID of an SA Controller, the following screen will be displayed:

| 1) Outputs Force |
| 2) Dampers Force |

Press <1> to access the Outputs Force Screen.

| Supply Fan Override Enter Override...: 0 |
| [0=Auto 1=ON 2=OFF] |

The first Outputs Force Screen allows the AHU fan relay to be set for Auto, ON, or OFF by entering a 0, 1, or 2 as desired. The default setting is 0=Auto. After you complete all troubleshooting or testing procedures, all relays should be changed back to this setting. The 1=ON setting will force the relay to the ON (energized) position. The 2=OFF selection will force the relay to the OFF (de-energized) position.
The next screen displays the Relay Overrides for Relay 2. After pressing <Enter>, the next relay will be displayed. All 20 Relay Override Screens (including the AHU fan relay) are available by pressing <Enter> after each setting is made.

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

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

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

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

Analog Output 2 Screen
AHU Fan VFD Override
Analog Output #2
Override Volts: -1.0
[-1.0=Auto]

Analog Output 3 Screen
Mod Heating Override
Analog Output #3
Override Volts: -1.0
[-1.0=Auto]
Status

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

Status Screen 1 - Mode

Line 2 Displays one of the following:
- Unoccupied Mode
- Occupied Mode
- Holiday Mode
- Forced Schedule Mode
- SUPPLY AIR CUTOFF!

Line 3 If you selected Entering Air as the controlling sensor, this line will display:
- Entering Air Control
If you select Space Temp or Supply Air Control, the display will show one of the following:
- Off Mode
- Vent Mode
- Cool Mode
- Heat Mode

Line 4 Displays one of the following:
- MM/DD/YY
- Fan Starting Delay and then time will display xx Left in Warm Up (Number of Minutes Left)

Status Screen 2 - Cooling, Heating, Economizer

SA Unit v2.20 ID 102
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

SA Unit v2.20 ID 102
Enable Tmp.: XX.X°F
Cooling Spt.: XX.X°F
Heating Spt.: XX.X°F

Line 2 Mode Enable Temperature
Can be the Supply Air Temperature, Entering 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

SA Unit v2.20 ID 102
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 SA 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 - Space Temp & Slide Adjust

SA Unit v2.20 ID 102
Space Tmp.: XX.X°F
Slide Adj.: XX.X°F

Line 2  Space Temperature
If you are using a Space Temperature Sensor, this line will display the current Space Temperature during the Occupied or Unoccupied Mode.

Line 3  Slide Adjust
This is the current value of the Space Temperature offset based on the position of the slide adjust switch on the Space Sensor.

Status Screen 6 - Entering Air Temperature & Entering Air Relative Humidity

SA Unit v2.20 ID 102
Entering Tmp: XX.X°F
Entering RH.: XX.X%

Line 2  Current Entering Air Temperature
If an Entering Air Temperature Sensor has been installed and configured on the unit or if an Entering Air Broadcast has been configured on another SA Controller on the system, the Entering 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 Entering Air Relative Humidity
If an Entering Air Humidity Sensor has been installed and configured on the SA Controller, the Entering Air Relative Humidity Percentage will appear on this line. If not, this line will display 0%.

Status Screen 7 - Entering Air Dewpoint & Dewpoint Setpoint

SA Unit v2.20 ID 102
Entering Dp : XX.X°F
Dewpoint Spt: XX.X°F

Line 2  Current Calculated Entering Air Dewpoint Temperature
If both an Entering Air Humidity Sensor and an Entering Air Temperature Sensor have been installed and configured on the unit, the calculated Entering Air Dewpoint Temperature will appear on this line. If not, this screen displays 0°F.

Line 3  Current Entering Air Dewpoint Setpoint
The user-adjustable Entering Air Dewpoint Temperature Setpoint will appear on this line.

Status Screen 8 - Indoor RH & Indoor RH Setpoint

SA Unit v2.20 ID 102
Indoor RH....: XXX%
Indoor RH Spt: XXX%

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

Line 3  Current Indoor Relative Humidity Setpoint Percentage
This is the adjustable Indoor Air Relative Humidity Setpoint Percentage that has been set by the user.
### Status Screen 9 - Coil Temp & Setpoint

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>Coil A1 Temperature</strong>&lt;br&gt;If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Coil B1 Temperature</strong>&lt;br&gt;If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Coil Temperature Setpoint</strong>&lt;br&gt;During dehumidification, the Coil Suction Temperature Setpoint is automatically reset based on the current space humidity conditions. This is the current calculated Coil Temperature Setpoint based on that reset.</td>
</tr>
</tbody>
</table>

### Status Screen 10 - Coil A2 & B2 Temp

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>Coil A2 Temperature</strong>&lt;br&gt;If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Coil B2 Temperature</strong>&lt;br&gt;If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.</td>
</tr>
</tbody>
</table>

### Status Screen 11 - Static Pressure & Output %

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>Current Static Pressure</strong>&lt;br&gt;Requires the installation and wiring of a Duct Static Pressure Sensor. If you do not have a Duct Static Pressure Sensor correctly installed and wired to the controller, this line will display “0.0”.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Current Static Pressure Output Signal Percentage</strong>&lt;br&gt;Indicates the output signal percentage being supplied to the VFD Controller or Bypass Damper Actuator when you have configured one of these options for your HVAC unit. If you have not configured Duct Static Pressure Control, this line will display [No Press Out Config].</td>
</tr>
<tr>
<td>4</td>
<td><strong>Indicates That This is An Optional Output</strong>&lt;br&gt;This output may or may not have live data to display.</td>
</tr>
</tbody>
</table>

### Status Screen 12 - Water Side Economizer Valve Position & Water Temperature

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>Water Side Economizer</strong>&lt;br&gt;This screen pertains to the Water Side Economizer.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Valve Position</strong>&lt;br&gt;The Water Side Economizer Valve position will display on this line.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Water Temperature</strong>&lt;br&gt;You must install and configure a Entering Water Temperature Sensor to display the current Water Temperature.</td>
</tr>
</tbody>
</table>

---

**Note:** This screen only applies if you have a WSHP Protection Module connected to the SA Controller.
Status Screen 13 - Water Side Economizer Bypass Valve Positions

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Water Side Economizer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This screen pertains to the Water Side Economizer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 3</th>
<th>Bypass Valve A Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Water Side Economizer’s Bypass Valve A position will display on this line.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 4</th>
<th>Bypass Valve B Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Water Side Economizer’s Bypass Valve B position will display on this line.</td>
</tr>
</tbody>
</table>

Status Screen 14 - MHGRV Output %

<table>
<thead>
<tr>
<th>SA Unit v2.20 ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Side Econo</td>
</tr>
<tr>
<td>Byps Vlv A: XXX %</td>
</tr>
<tr>
<td>Byps Vlv B: XXX %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Current MODGAS Heating Output Signal Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>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 SA Controller, this screen will indicate [MODGAS NOT CONNECTED].</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 3</th>
<th>Current MHGRV Reheat Valve Output Signal Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indicates the percentage of the output signal being supplied to the MHGRV controller when you have one connected to your SA Controller. If you do not have a MHGRV controller connected to your SA Controller, this screen will indicate [MHGRV NOT CONNECTED].</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 4</th>
<th>Optional Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indicates that these outputs are optional and therefore may or may not have live data to display.</td>
</tr>
</tbody>
</table>

Status Screen 15 - Mod Cooling %

<table>
<thead>
<tr>
<th>SA Unit v2.20 ID 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mod Cooling 1: XXX%</td>
</tr>
<tr>
<td>Mod Cooling 2: XXX%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Current Modulating Cooling Stage 1 Output Signal Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indicates the percentage of the output signal being supplied to a Modulating Cooling device when you have configured this option for your HVAC unit. This can either be Chilled Water or Digital Compressor. If Reverse Acting operation is configured, this percentage will be Reversed. See the following examples for clarification:</td>
</tr>
</tbody>
</table>

**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 configured, this screen will indicate [No Mod Cool 1 Config].

<table>
<thead>
<tr>
<th>Line 3</th>
<th>Current Modulating Cooling Stage 2 Output Signal Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indicates the percentage of the output signal being supplied to a Modulating Cooling device when you have configured this option for your HVAC unit. This can only be Digital Scroll Compressor. See the following examples for clarification:</td>
</tr>
</tbody>
</table>

**Standard Operation:**
- 1.5-5.0 VDC: 0% = 1.5 VDC 100% = 5.0 VDC

If you do not have a Modulating Cooling device connected to your HVAC unit and configured, this screen will indicate [No Mod Cool 2 Config].

<table>
<thead>
<tr>
<th>Line 4</th>
<th>Indicates That These Are Optional Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>These outputs may or may not have live data to display.</td>
</tr>
</tbody>
</table>
### Status Screen 16 - Mod Heating %

**SA Unit v2.20 ID 102**

Mod Heating: 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 1 Config].

**Line 4**
Indicates That These Are Optional Outputs

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

### Status Screen 17 - Head Pressure Setpoint

**SA Unit v2.20 ID 102**

Current Head Pr Spt: 0 PSI

**Line 2-3**
Current Head Pressure Cooling or Reheat Setpoint

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

### Status Screen 18 - Leaving Water Temp

**SA Unit v2.20 ID 102**

Leaving Water Temp

Temp A: XX.X°F
Temp B: XX.X°F

**Line 2**
Leaving Water Temperature

If this is a Water Source Heat Pump Unit with a Water Source Heat Pump Protection Module, the Leaving Water Temperature will display, depending on what mode the Module is in. This status value will show 0 if not in the Cooling or Dehumidification Mode.

**Line 3**
Temperature A

This is the temperature of the water leaving the Water Side Economizer A.

**Line 4**
Temperature B

This is the temperature of the water leaving the Water Side Economizer B.

### Status Screen 19 - Condenser #1

**SA Unit v2.20 ID 102**

Condenser #1

Head Pr......: 0 PSI
Cond Valve: 0%

**Line 2**
Condenser #1

If you are using the Two Condenser Head Pressure Module attached to the unit, this line displays Condenser #1.

**Line 3**
Head Pressure

This line indicates the highest of the first two current Head Pressure readings on the Two Condenser Head Pressure Module.

**Line 4**
Condenser Valve

This line displays the position of the associated Condenser Valve (0-100%) that is currently necessary to maintain the Head Pressure Setpoint.
## Status Screen 20 - Condenser #2

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>Condenser #1</strong>&lt;br&gt;If you are using the Two Condenser Head Pressure Module attached to the unit, this line displays Condenser #2.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Head Pressure</strong>&lt;br&gt;This line indicates the highest of the second two current Head Pressure readings on the Two Condenser Head Pressure Module.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Condenser Valve</strong>&lt;br&gt;This line displays the position of the associated Condenser Valve (0-100%) that is currently necessary to maintain the Head Pressure Setpoint.</td>
</tr>
</tbody>
</table>

### Status Screens 21-27 - Fan Relay

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>Current Supply Fan Relay Status</strong>&lt;br&gt;The letters FRC will appear before the colon if this Relay is in a Force Mode. On screens 21 to 27, this line will indicate the relays use and the ON/OFF condition for that relay. Possible options are as follows:&lt;br&gt;Not Used Pre-Heater&lt;br&gt;Heat Stage Alarm Relay&lt;br&gt;Cool Stage Override&lt;br&gt;Warmup Mode Occupied&lt;br&gt;Rev Valve WS Economizer&lt;br&gt;Gas Re-Heat (HGR Relay)</td>
</tr>
<tr>
<td>3</td>
<td><strong>Current relay status and description of what it is configured for</strong>&lt;br&gt;The letters FRC will indicate the relay is forced to its current condition.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Current relay status and description of what it is configured for</strong>&lt;br&gt;The letters FRC will indicate the relay is forced to its current condition.</td>
</tr>
</tbody>
</table>

## Status Screen 28 - Alarm Conditions

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Blank</td>
</tr>
<tr>
<td>3</td>
<td><strong>Alarm Conditions</strong>&lt;br&gt;Can be one of the following:&lt;br&gt;NO SUPPLY AIR TEMP&lt;br&gt;NO ENTERING AIR TEMP&lt;br&gt;SPACE SENSOR FAILURE&lt;br&gt;MECH COOLING FAILURE&lt;br&gt;MECH HEATING FAILURE&lt;br&gt;FAN PROVING ALARM&lt;br(DIRTY FILTER ALARM&lt;br&gt;EMERGENCY SHUTDOWN&lt;br&gt;NO WATER FLOW ALARM&lt;br&gt;DRAIN OVERFLOW ALARM&lt;br&gt;LO SUPPLY AIR ALARM&lt;br&gt;HI SUPPLY AIR ALARM&lt;br&gt;LOW CONTROL TEMP&lt;br&gt;HIGH CONTROL TEMP&lt;br&gt;MODULE ALARM</td>
</tr>
</tbody>
</table>

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

For Alarm Definitions, see the *SA Controller Technical Guide* or the *SA E-BUS 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.

System Manager Instructions

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

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

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

Modular Service Tool Instructions

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

Configuration Screen #1 - Box Configuration

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

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

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

Configuration Screen #2 - Damper Operation

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

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

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

Configuration Screen #3 - Voting Zone

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

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

Configuration Screen #4 - Pressure Independent Airflow Constant

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

If this is a Pressure Independent Box, you must enter this airflow constant so that the CFM readings can be correctly calculated. This airflow constant is provided by the box manufacturer and depends on the diameter of the duct.
**Configuration Screen #5 - Expansion Relays**

**Heating Stages**

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

If you require the VAV/Zone Controller to control reheat for the zone it is installed in, you must include a relay expansion board and then configure the number of heating stages (1, 2, or 3) that it will be controlling whenever there is a heating demand in the space. *Enter <0> if you don’t require this option.*

---

**Configuration Screen #6 - Proportional Heating Signal**

XX Box Cnfg IDXXXX
Proportional Heating Signal.: 0 - 10 VDC
[0 = 0-10 1 = 2-10]

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

---

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

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

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

---

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

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

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

---

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

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

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

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

---

**Configuration Screen #10 - Dump Zone**

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

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

---

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

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

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

Setpoint Screen #1 - Occupied Setpoints

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

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

Setpoint Screen #2 - Unoccupied Setbacks

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

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

Setpoint Screen #3 - AHU Heat Call Space Temp

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

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

Setpoint Screen #4 - 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 #5 - 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 #6 - Damper Airflow Cool/Heat Minimum

<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 1000 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>

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

Setpoint Screen #7 - Damper Airflow Night Min and Fan On Min

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

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

Setpoint Screen #8 - Damper Airflow Reheat Min

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

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

Setpoint Screen #9 - Damper Airflow Fixed Position

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

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

Setpoint Screen #10 - SAT HVAC Mode Deadband

<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 10°F</td>
<td>20°F</td>
<td></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.
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.

### Setpoint Screen #11 - Zone Alarm Offsets

<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 #12 - Zone Alarm Delay

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

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

### Setpoint Screen #13 - Day/Night Schedule

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

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

### Setpoint Screen #14 - Maximum Slide Offset

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 #15 - Push-Button Override Duration

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 #16 - Maximum EMS Offset

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 #17 - Sensor Calibration for Space Temp and Supply Air Temp

Sensor Calibration
SPC: XXX.X° XXX.X°
SAT: XXX.X° XXX.X°
[SAT Only if Sensor]

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

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

<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>
Programming

VAV/Zone Controller Status Screens

VAV/Zone Controller Status

Status Screen #1 - Mode of Operation

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Unoccupied Mode</th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 3</th>
<th>OFF Mode</th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 4</th>
<th>Belongs to Group # xx</th>
</tr>
</thead>
<tbody>
<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>XX Box v4.01 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone Temp.: XX.X°F</td>
</tr>
<tr>
<td>Cooling Spt: XX.X°F</td>
</tr>
<tr>
<td>Heating Spt: XX.X°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Current Zone Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Currently active Cooling Setpoint based on the current Occupied / Unoccupied mode of operation.</td>
</tr>
<tr>
<td>Line 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>XX Box v4.01 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide Offset: XX.X°F</td>
</tr>
<tr>
<td>H/C Demand.: XX.X°F</td>
</tr>
</tbody>
</table>

| Line 2 | If the optional Setpoint Slide Adjust is installed on the Flush Mount Wall Sensor, this line will display the current amount the Slide Offset is affecting the Heating and Cooling Setpoints. |
| Line 3 | Current Heating or Cooling Demand in the Zone based on the current Heating and Cooling Setpoints when compared to the current Zone Temperature. |
| Line 4 | Blank |

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

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

| Line 2 | Current Supply Air Temperature received via broadcast from the DX Air Handler or from the Box Controller’s own installed Box Air Temperature Sensor connected to the AUX input of the VAV/Zone controller board. |
| Line 3 | Current Box Air Temperature |
|        | If you have configured the SA Controller to broadcast the Supply Air Temperature to the VAV/Zone controller and don’t have a Box Air Temperature Sensor attached to the AUX input on the VAV/Zone controller board, this line will display the Supply Air Temperature the same as line 2. |
|        | If you have a Box Air Temperature Sensor attached to the AUX input on the VAV/Zone controller board, this line will display the Box Air Temperature at the location where the Box Air Temperature Sensor is installed. |
| Line 4 | Blank |
**Status Screen #5 - Zone Damper Position, Airflow, and Desired CFM**

<table>
<thead>
<tr>
<th>XX Box v4.01 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damper FRC: XXX %</td>
</tr>
<tr>
<td>Airflow : XXX CFM</td>
</tr>
<tr>
<td>Desired : XXXX CFM</td>
</tr>
</tbody>
</table>

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

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

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

**Status Screen #6 - Fan Status & Reheat Stages**

<table>
<thead>
<tr>
<th>XX Box v1.04 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Status : OFF</td>
</tr>
<tr>
<td>Heating Relay#1 : OFF</td>
</tr>
<tr>
<td>Heating Relay#2 : OFF</td>
</tr>
</tbody>
</table>

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

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

**Status Screen #7 - Alarm Status**

<table>
<thead>
<tr>
<th>XX Box v1.04 IDXXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO ALARMS!</td>
</tr>
</tbody>
</table>

**Line 2** Blank

**Line 3** NO ALARMS!  
This is displayed if no alarms are detected. If there are one or more alarms active, the possible messages are shown below:

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

For Alarm Definitions, see the SA Controller Technical Guide or the SA E-BUS Controller Technical Guide.
**Programming**

**SA Controller Operator Interface**

## VAV/Zone Controller Damper Force Modes

### Damper Force Modes

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

### System Manager Instructions

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

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

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

1) Outputs Force
2) Dampers Force

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

### Modular Service Tool Instructions

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

1) Outputs Force
2) Dampers Force

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

### Damper Force Mode Screen

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

#### Damper Force ID 102

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

Set the appropriate Damper Force Mode by entering numbers 0 through 5. The Force Modes for each of these settings is outlined below.

- 0 = Auto: This is the default setpoint. With this setting, the damper will operate normally and modulate according to the controller setpoints.
- 1 = Open: This setting will force the damper to its fully-open position.
- 2 = Clsd: This setting will force the damper to its fully-closed position.
- 3 = Max: This setting will force the damper to the damper’s maximum airflow position set under VAV/Zone Controller Setpoint Screen #5 (see page 48).
- 4 = Min: This setting will force the damper to the current mode’s minimum position setpoint. These modes are Vent Mode, Heat Mode, and Cool Mode. They may each have a different minimum depending on how you configured the setpoints. See VAV/Zone Controller Setpoint Screen #5 on page 48.
- 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 49 for available setpoint information.

#### Caution:

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

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

System Manager Instructions

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

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

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

Modular Service Tool Instructions

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

Configuration Screen #1 - System Type

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

Configuration Screen #2 - Last Polled Zone

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

Configuration Screen #3 - Mode Changeover Time

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

Configuration Screen #4 - Optimal Start Target Zone

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

Configuration Screen #5 - Maverick Testing

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

Configuration Screens #6-65 - Alarm Polling

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

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

- **Polling Device**
- **System Occupied**
- **Venting Mode**
- **XXX Min Left in Mode**

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Current Schedule Mode</th>
<th>Can be System Occupied or System Unoccupied.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 3</td>
<td>Currently System Status</td>
<td>Can be Vent Mode, Cooling Mode, or Heat Mode.</td>
</tr>
<tr>
<td>Line 4</td>
<td>Minutes Left In Mode</td>
<td>The number of minutes left in the current mode of operation before it can switch modes. This value is user-adjustable. See Configuration Screen #3.</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Line 2</th>
<th>Mode Priority</th>
<th>Can be Heat Priority or Cool Priority. This is based on the voting zones and their demand.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 3</td>
<td>Cool Total</td>
<td>Total cooling temperature demand from all zones.</td>
</tr>
<tr>
<td>Line 4</td>
<td>Heat Total</td>
<td>Total heating temperature demand from all zones.</td>
</tr>
</tbody>
</table>
1 HVAC Unit w/Boxes on Multiple Loops Screen........23
24-Hour Military Format.............35
63...........10
1111........12
2222........12
2359........35

A

Adaptive Defrost Timer Adjustment........33
Address
    Entering........9
AHU Fan VFD Override........39
AHU Heat Call Space Temperature
    VAV/Zone........48
Airflow
    VAV/Zone Status........53
Alarm Relay........45
Alarm Relay Configuration........24
Alarms
    Button........9
    Clearing........11,13
    MiniLink Polling........11,55
    Modular Service Tool........11,13
    Search Screen........13
    VAV/Zone Status........53
Alarms for SA Controller........45
Analog Output Override Screen........39
Application Configurations........15
Applications
    CAV Operation........15
    Exhaust Hood........16
    Heat Pump........16
    MUA Operation........16
    Precision Air Control Units........16
    Supply Air Setpoint Reset........16
    VAV Operation........15
Arrow Keys
    Defined........8
Auto Damper Force Mode........38
        ........54
Automatic Power Down........14

B

Balance-Test Button........38,54
    Defined........9
Box Air Temperature
    VAV/Zone Status........52
Box Configuration
    VAV/Zone........46
Box Heat Allow
    VAV/Zone........47
Broadcast
    Internal Schedule Screen........22
    Internal Time Clock Screen........22
    Status Fan & Heat Screen........22
    Supply Temperature Screen........22
    VAV Boxes Force to Fix Screen........23
    VAV Boxes Force to Max Screen........22
Broadcast to Multiple Loops........23
Buttons
    Balance Test........38,54
    Configuration........46
    Overrides........12
    Schedule........35
    Setpoints........25,46,54
    Status........40
Bypass Damper........18
Bypass Valve A Position........43
Bypass Valve B Position........43

C

CAV Operation........15
Change Passcodes........12
Chilled Water Output Signal
    Screen........20
Chilled Water Valve........20
Clear Alarms........13
    Alarms........11
Clear Key
    Defined........8
Closed
    Damper Force Mode........38,54
    Coil A1 Temperature........42
    Coil A2 Temperature........42
    Coil B1 Temperature........42
    Coil B2 Temperature........42
    Coil Temperature........42
    Coil Temperature & Setpoint........42
    Coil Temperature Setpoint........42
    CommLink........10
Communications Screen........10,13
Condenser Valve Percentage........44,45
Configuration........46
    Button........9,18,46
    Reset Interval Rate........18
    Screen Index........17
Configuration Screens
    Reset Interval Rate........18
Index

C-E

Configuring
  CAV Operation........15
  Exhaust Hood Applications........16
  Heat Pump........16
  MUA Operation........16
  Multiple System Managers Mode........10
  Network Mode........10
  Precision Air Control Units........16
  Stand-Alone Mode........10
  Supply Air Setpoint Reset........16

Connection Diagram
  Modular Service Tool........4
  System Manager........5

Continuous OFF Mode........35
Continuous ON Mode........35
Cooling Head Pressure Setpoint........29
Cooling & Heating Stage Delays Screens........23
Cooling Min On Time........23
Cooling Min Run Time........23

Cooling ONLY BOX
  VAV/Zone........46

Cooling Setpoints
  VAV/Zone Status........52
  Cooling Stage Relay........45
  Cooling Stage Relay Configuration........24
  Cooling Status
    SA Controller........40
  Cool Reset Source
    Screen........26
  Cool Total
    MiniLink PD Status........56

Current Active Supply Air Setpoint........40
Current Supply Air Temperature........40
Cutoff Temperature Setpoints........28

Data Entry Keys
  Described........8

Date
  Programming........37

Daylight Savings........37
  Time Auto Adjust Screen........37

Day/Night Schedule
  VAV/Zone........50

DEC Key
  Defined........8

Defrost Adaptive Timer........33
Defrost Mode........32
Defrost Temp Setpoint........32
Defrost Timer........32

Dehumidification
  Coil Temperature Setpoint........29
  Control Screen........19
  Indoor RH & OA Dewpoint Setpoints........29
  Priority Screen........19
  Unoccupied Screen........19

Delta Setpoint........30

Desired CFM
  VAV/Zone Status........53

Dewpoint Temp
  SA Controller........41
  Digital Compressor........20
  Digital Compressor Signal Screen........20

Dimensions
  Modular Service Tool........3
  System Manager........3

Display Screen
  Described........8

DRAIN FLOW ALARM........45

Duct Static Pressure Control Output Signal........30

Duct Static Pressure Screen........18

Dump Zone
  VAV/Zone........47

Damper Airflow
  Cool/Heat Minimum........49
  Fan On Minimum........49
  Fixed Position........49
  Integral........48
  Maximum........48
  Night Minimum........49
  Reheat Minimum........49
  Vent Minimum........48

Damper Force
  Modes........37,54
  Mode Screen........54

Damper Operation
  VAV/Zone........46

Dampers Forced Closed........38

Dampers Force Mode Screen........38
Enter
- Key........8
- New Passcode........12

Entering Air
- Configuration.........18
- Humidity Sensor Screen.........19
- HVAC Reset Source.........18

Entering Air Control.........40
Entering Air Dewpoint.........41
Entering Air Humidity Sensor.........30
Entering Air Lockouts.........28
Entering Air Relative Humidity.........41
Entering Air Temperature.........41
ESC Key
- Defined........8
Exhaust Fan Relay Configuration.........24
Expansion Relays Heating Stages
- VAV/Zone.........47

F
- Fan On Min.........49
- Fan Status
  - .........53
- Fan VFD Percentage.........18
- Firestat.........15,16
- Firestat Input.........22
- Fixed
  - Damper Force Mode.........38,54
- Fixed Position
  - Damper Airflow.........49
- Forced Schedule Mode.........40
- Free Cooling.........30

G
- Gas Reheat Relay.........45

H
- H/C Changeover Box
  - VAV/Zone.........46
- Head Pressure
  - Status Screen.........44
- Head Pressure Condenser Fan #1
  - Status.........44
- Head Pressure Condenser Fan #2
  - Status.........45
- Head Pressure Module.........29
- Head Pressure Module Screen.........21
- Head Pressure Output Minimum Position Setpoint.........30
- Head Pressure Setpoint.........44
- Heat During Dehumidify Screen.........19
- Heating
  - Min Off Time.........23
  - Min Run Time.........23
  - Setpoints.........52
  - Stage Down.........23
  - Stage Up.........23
  - Status.........40
- Heating/Cooling Demand
  - VAV/Zone Status.........52
- Heating Stage Relay.........45
- Heating Stage Relay Configuration.........24
- Heat Pump.........16
- Heat Pump Auxiliary Heating Delay.........32
- Heat Pump Control
  - Screen.........21
- Heat Pump Defrost Temperature.........32
- Heat Pump Defrost Timer.........32
- Heat Reset Source Setpoints.........27
- Heat Total
  - MiniLink PD Status.........56
- HGR Relay.........45
- Hi SAT Cutoff.........28
- Holiday Mode.........40
- Holidays
  - Programming.........35
  - Start/Stop Times.........36
- Hot Gas Reheat Relay Configuration.........24
- HVAC Mode
  - Cooling Setpoints.........26
  - Heating Setpoints.........26
  - Reset Source Screen.........18
  - Select Deadband Setpoint.........26
  - Setpoints.........26
- HVAC Mode Enable
  - Screen.........18
- HVAC Mode Schedule Setpoint.........31
- HVAC Mode Sensor Slide Offset Setpoint.........32
- HVAC Reset Source.........18
  - Entering Air.........18
  - Fan VFD Percentage.........18
  - No Reset.........18
  - Remote Reset Signal.........18
  - Space Temperature Sensor.........18
**Index**

**I-M**

**I**

Indoor Air  
Humidity Screen........19  
Indoor Relative Humidity Percentage........41  
Indoor RH........41  
Indoor RH Setpoint........41  
Initialization  
   Modular Service Tool........13  
   Screen........13  
   System Manager........10  
Internal Schedule Optimal Start Soak Multiplier  
   Setpoint........33

**K**

Keys  
   Described........8  
   Function........8

**L**

Last Polled Zone  
   MiniLink PD........55  
Leaving Water Temperature........44  
Level 1 User  
   Defined........12  
Level 2 User  
   Defined........12  
Loop  
   Address........9  
   Search........11  
   Search Screen........11  
Lo SAT Cutoff........28  
Low Ambient Temperature Setpoints........31

**M**

Main Fan Status  
   VAV/Zone........47  
Maverick Testing  
   MiniLink PD........55  
Maximum  
   Damper Force Mode........38,54  
   EMS Offset VAV/Zone........50  
   Slide Offset VAV/Zone........50  
 Mechanical Heat/Cool Failure Time  
   Time Period Setpoint........31  
MHGRV Reheat Valve Output Signal........43  

| Min  | Damper Force Mode........38,54  |  
| MinLink PD Configuration........55  |  
| Alarm Polling........55  |  
| Last Polled Zone........55  |  
| Maverick Testing........55  |  
| Mode Changeover Time........55  |  
| Optimal Start Target Zone........55  |  
| System Type........55  |  
| MiniLink PD Status........10  |  
| Adding Additional........11  |  
| Cool Total........56  |  
| Heat Total........56  |  
| Minutes Left........56  |  
| Mode Priority........56  |  
| Schedule Mode........56  |  
| System Status........56  |  
| Minimum Run Times and Off Times........23  |  
| Min Supply Fan VFD Speed........28  |  
| Minus Key  
   Defined........8  |  
| Minutes Left  
   MiniLink PD Status........56  |  
| MM (Multiple System Manager Mode)........10  |  
| Mod Cool 1 Override........39  |  
| Mod Cool 2 Override........39  |  
| Mod Cooling %........43  |  
| Mode  
   Changeover Time........55  |  
   Cooling Setpoint........40  |  
   Enable Temperature........40  |  
   Heating Setpoint........40  |  
   of Operation........13,52  |  
   Priority........56  |  
   SA Controller Status Screen........40  |  
   Selection Buttons Defined........9  |  
| Mod Heating %........44  |  
| Mod Heating Override........39  |  
| Modular Service Tool........13  |  
| Alarms Button........13  |  
| Alarm Search........13  |  
| Configuration Button........18  |  
| Connection Diagram........4  |  
| Defined........3  |  
| Dimensions........3  |  
| Energy Saving Timer........14  |  
| Initialization........13  |  
| Initialization Screen........13  |  
| Mode Selection Buttons........9  |  
| Network Configuration........13  |  
| Overrides Button........14  |  
| Override Search........14  |
Overrides Tool........13
SA Controller Setpoints........25
Stand-Alone Configuration........13

Modular System Manager
 Connection Diagram........5
 Defined........3
 Dimensions........3
 Network Connection........5
 Stand-Alone Connection........7

Modulating
 Cooling/Heating Screen........20
 Cooling Proportional Window Screen........21
 Cooling Reverse Acting Screen........21
 Heating Output Signal Screen........20
 Heating Proportional Window Screen........20
 Heating Reverse Acting Screen........20

Modulating Hot Water Valve........20
 Modulating Steam Valve........20

Month........37

Morning Warm Up
 Max Length........28
 Target Temp........28

Morning Warm Up Temp Setpoint........28

MUA Operation........16

Multiple Digital Compressors Screen........21
 Multiple Loops........23
 Multiple MGRS........10
 Multiple System Managers Mode
 Configuring for........10

Network Configuration
 Modular Service Tool........13

Network Connection
 Modular System Manager........5
 Network Mode (NM)........13
 Configuring for........10

Night Minimum
 Damper Airflow........49

No Reset........18

NO WATER FLOW ALARM........45

Occupied
 Mode........36
 Setpoints........48

Occupied Mode........40

Occupied Relay........45
 Occupied Relay Configuration........24

OE391-08........3
 OE392-08........3

OFF Mode
 Continuous........35

ON Mode
 Continuous........35

Open Damper Force Mode........38,54

Optimal Start Target Zone
 MiniLink PD........55

OUTPUT FORCE MODE!........40

Outputs Force........38

Override Mode........40
 Override Relay........45
 Override Relay Configuration........24

Overrides
 Button........9,12,14
 Screen........12,14
 Search........12,14

P

PARALLEL FAN BOX
 VAV/Zone........46

Passcode
 1111........12
 2222........12

Clearance........10
 Codes........12
 Enter New........12
 System Manager........12

Power/Comm Board Wiring........6

Power Down........14

Precision Air Control Units........16

Pre-Heater Relay........45

Pre-heat Relay Configuration........24

Pressure Independent Airflow Constant
 VAV/Zone........46

Programming
 CAV Operation........15
 Date........37
 Daylight Savings........37
 Day of Week........37

Exhaust Hood Applications........16
 Heat Pump........16
 Holidays........35
 Holiday Start/Stop Times........36

Month........37

MUA Operation........16
 Precision Air Control Units........16
 Supply Air Setpoint Reset........16

Time & Date........36
 VAV Operation........15
 Year........37
Index

P-S

Proof of Flow Input Screen...........20
Proof of Flow Switch...........20
Proportional Heating Signal
  VAV/Zone...........47
PURGE MODE...........40
Push-Button Override
  Duration...........50
  VAV/Zone...........47
Push-Button Override Duration Setpoint...........32

Reversing Valve Active During Heat/Cool
  Screen...........21
Reversing Valve Relay...........45
Reversing Valve Relay Configuration...........24

S

SA Controller
  AHU Fan VFD Override...........39
  Alarm Conditions...........45
  Analog Output Override...........39
  Coil Temperature...........42
  Configuration Screens...........18
  Cooling...........40
  Damper Force Modes...........37,38
  Date...........37
  Dewpoint Temp...........41
  Economizer...........40
  Economizer Overrides...........39
  Entering Air Dewpoint...........41
  Entering Air Relative Humidity...........41
  Entering Air Temperature...........41
  Head Pressure Setpoint...........44
  Heating...........40
  Holidays...........35
  Holiday Start/Stop Times...........36
  Leaving Water Temperature...........44
  MHGRV Output %...........43
  Mod Cool 1 Override...........39
  Mod Cool 2 Override...........39
  Mod Cooling %...........43
  Mode...........40
  Mode Cooling Setpoint...........40
  Mode Enable Temperature...........40
  Mode Heating Setpoint...........40
  Mod Heating %...........44
  Mod Heating Override...........39
  Occupied Mode...........36
  Outputs Force...........38
  Relay Overrides...........39
  Schedule Override...........36
  Scheduling...........35
  Space Temperature Return Air and Slide Adjust...........41
  Static Pressure Output %...........42
  Status Screens...........40
  Supply Air Temperature & Setpoint...........40
  Supply Fan Relay...........45
  Time & Date...........36
  Unoccupied Mode...........36
  Week Schedules...........35
  WSE Bypass A Override...........39
  WSE Bypass B Override...........39

R

R22 Refrigerant...........29
R410A Refrigerant
  Screen...........23
Real Time Clock...........36
Refrigerant...........29
Reheat
  Stages...........53
  Reheat Head Pressure Setpoint...........29
Reheat Minimum
  Damper Airflow...........49
Re-Heat Relay...........45
Relay
  Configuration Screens...........24
  Overrides...........39
Relay Configuration
  Alarm...........24
  Cooling Stage...........24
  Heating Stage...........24
  Hot Gas Reheat...........24
  Occupied...........24
  Override...........24
  Pre-Heater...........24
  Reversing Valve...........24
  Warm-up Mode...........24
Relay Overrides
  AHU Fan VFD Override...........39
  Economizer Overrides...........39
  Mod Cool 1 Override...........39
  Mod Cool 2 Override...........39
  Mod Heating Override...........39
  WSE Bypass A Override...........39
  WSE Bypass B Override...........39
Relays...........45
Remote
  Signal Contact...........35
Remote FRC Occupied...........40
Remote Reset Signal
  HVAC Reset Source...........18
Reset Source...........18
  Cooling Setpoint...........26
  Reset Interval Rate Screen...........18
SA Controller Holiday Schedule........35
SA Controller Setpoints............25
  Adaptive Timer Defrost Adj. Setpoint........33
  COIL Sensor Calibration............34
  Cool Reset Source................26
  Cutoff Temperature...............28
  Dehumidification Coil Temperature....29
  Dehumidification Indoor RH & OA Dewpoint...29
  Entering Air Lockouts..............28
  Head Pressure....................29
  Head Pressure Output Minimum Position...30
  Heat Pump Auxiliary Heating Delay......32
  Heat Pump Defrost Setpoints..........32
  Heat Reset Source................27
  HVAC Mode Select Deadband.........26
  HVAC Mode Sensor Slide Offset.........32
  HVAC Schedule....................31
  Internal Schedule Optimal Start Soak Multiplier.....33
Mechanical Heat/Cool Failure Time Period....31
  Minimum Supply Fan VFD Speed for Heating......28
  Morning Warm Up Temp...............28
  Preheat Ambient Temperature..........31
  Push-Button Override Duration.........32
  Reheat Head Pressure...............29
  Reset Source Cooling..............26
  SAT Cooling......................26
  SAT Heating Setpoints.............27
  Screens........................26
  Sensor Calibration for EAT & EWT....33
  Sensor Calibration for SPC & SAT....33
  Stage Control Window..............28
  Static Setpoint, Deadband & Control Rate......30
  Supply Fan Starting Delay Timer........31
  Trend Log Interval.................33
  Unoccupied Setbacks..............26
  Water Side Economizer Setpoints......30
SA Controller Status Screens..........40
SA (Stand Alone)................10
  SAT..........................33
  SAT Cooling Setpoints.............26
  SAT Heating Setpoints.............27
  Saturation Vapor Pressure...........29
Schedule
  Button................9,35
  Mode................56
  Override...........35,36
  Time & Date...........36
Scheduling
  SA Controller.............35
  SCR Controlled Electric Heater......20

Screens
  1 HVAC Unit w/Boxes on Multiple Loops.......23
  Adaptive Defrost Adjustment Setpoint.........33
  AHU Fan VFD Override................39
  Alarm Search Screen................13
  Analog Output Override Screen.............39
  Broadcast Internal Schedule Screen.........22
  Broadcast Internal Time Clock Screen.........22
  Broadcast Status Fan & Heat Screens.........22
  Broadcast Supply Temperature Screen.........22
  Broadcast VAV Boxes Force to Fixed Screen.....23
  Broadcast VAV Boxes Force to Max Screen.....22
  Chilled Water Output Signal.............20
  Communications Screen................10,13
  Configuration Screens................17
  Cooling & Heating Stage Delays Screens.......23
  Cool Reset Source Setpoints...............26
  Cutoff Temperature Setpoints............28
  Damper Force Mode Screen................54
  Dampers Force Mode...................38
  Daylight Savings Time Auto Adjust Screen.....37
  Dehumidification Coil Temperature Setpoints...29
  Dehumidification Control Screens..........19
  Dehumidification Indoor RH & OA
    Dewpoint Setpoints...............29
  Dehumidification Priority Screen..........19
  Dehumidification Unoccupied Screens........19
  Digital Compressor Signal Screen...........20
  Duct Static Pressure Screen.............18
  Economizer Overrides................39
  Emergency Shutdown Input...............22
  Energy Saving Screen................14
  Entering Air Lockouts...........28
  Entering Humidity Sensor Screen...........19
  Head Pressure Module.................21
  Head Pressure Output Minimum
    Position Setpoint...............30
  Head Pressure Setpoint Cooling.........29
  Head Pressure Setpoint Reheat...........29
  Heat During Dehumidify Screen...........19
  Heat Pump Auxiliary Heating Delay.........32
  Heat Pump Control..................21
  Heat Pump Defrost Setpoints...........32
  Heat Reset Source................27
  Holiday Schedule..................36
  HVAC Mode Enable Screen...............18
  HVAC Mode Select Deadband..............26
  HVAC Mode Select Deadband Setpoints......26
  HVAC Mode Sensor Slide Offset Setpoint.....32
  HVAC Mode Setpoints..............26
  HVAC Reset Source................18
  HVAC Schedule Setpoint.............31

SA Controller Operators Interface

SA Controller Holiday Schedule........35
SA Controller Setpoints............25
  Adaptive Timer Defrost Adj. Setpoint........33
  COIL Sensor Calibration............34
  Cool Reset Source................26
  Cutoff Temperature...............28
  Dehumidification Coil Temperature....29
  Dehumidification Indoor RH & OA Dewpoint...29
  Entering Air Lockouts..............28
  Head Pressure....................29
  Head Pressure Output Minimum Position...30
  Heat Pump Auxiliary Heating Delay......32
  Heat Pump Defrost Setpoints..........32
  Heat Reset Source................27
  HVAC Mode Select Deadband.........26
  HVAC Mode Sensor Slide Offset.........32
  HVAC Mode Setpoints..............27
  HVAC Reset Source................26
  HVAC Schedule Setpoint.............31

Index

S

SA Controller Holiday Schedule........35
SA Controller Setpoints............25
  Adaptive Timer Defrost Adj. Setpoint........33
  COIL Sensor Calibration............34
  Cool Reset Source................26
  Cutoff Temperature...............28
  Dehumidification Coil Temperature....29
  Dehumidification Indoor RH & OA Dewpoint...29
  Entering Air Lockouts..............28
  Head Pressure....................29
  Head Pressure Output Minimum Position...30
  Heat Pump Auxiliary Heating Delay......32
  Heat Pump Defrost Setpoints..........32
  Heat Reset Source................27
  HVAC Mode Select Deadband.........26
  HVAC Mode Sensor Slide Offset.........32
  HVAC Mode Setpoints..............27
  HVAC Reset Source................26
  HVAC Schedule Setpoint.............31

Scheduling

SA Controller Holiday Schedule........35
SA Controller Setpoints............25
  Adaptive Timer Defrost Adj. Setpoint........33
  COIL Sensor Calibration............34
  Cool Reset Source................26
  Cutoff Temperature...............28
  Dehumidification Coil Temperature....29
  Dehumidification Indoor RH & OA Dewpoint...29
  Entering Air Lockouts..............28
  Head Pressure....................29
  Head Pressure Output Minimum Position...30
  Heat Pump Auxiliary Heating Delay......32
  Heat Pump Defrost Setpoints..........32
  Heat Reset Source................27
  HVAC Mode Select Deadband.........26
  HVAC Mode Sensor Slide Offset.........32
  HVAC Mode Setpoints..............27
  HVAC Reset Source................26
  HVAC Schedule Setpoint.............31

Scheduling

SA Controller Holiday Schedule........35
SA Controller Setpoints............25
  Adaptive Timer Defrost Adj. Setpoint........33
  COIL Sensor Calibration............34
  Cool Reset Source................26
  Cutoff Temperature...............28
  Dehumidification Coil Temperature....29
  Dehumidification Indoor RH & OA Dewpoint...29
  Entering Air Lockouts..............28
  Head Pressure....................29
  Head Pressure Output Minimum Position...30
  Heat Pump Auxiliary Heating Delay......32
  Heat Pump Defrost Setpoints..........32
  Heat Reset Source................27
  HVAC Mode Select Deadband.........26
  HVAC Mode Sensor Slide Offset.........32
  HVAC Mode Setpoints..............27
  HVAC Reset Source................26
  HVAC Schedule Setpoint.............31

SA Controller Holiday Schedule........35
SA Controller Setpoints............25
  Adaptive Timer Defrost Adj. Setpoint........33
  COIL Sensor Calibration............34
  Cool Reset Source................26
  Cutoff Temperature...............28
  Dehumidification Coil Temperature....29
  Dehumidification Indoor RH & OA Dewpoint...29
  Entering Air Lockouts..............28
  Head Pressure....................29
  Head Pressure Output Minimum Position...30
  Heat Pump Auxiliary Heating Delay......32
  Heat Pump Defrost Setpoints..........32
  Heat Reset Source................27
  HVAC Mode Select Deadband.........26
  HVAC Mode Sensor Slide Offset.........32
  HVAC Mode Setpoints..............27
  HVAC Reset Source................26
  HVAC Schedule Setpoint.............31
Screens, continued
  Indoor Humidity Sensor Screen........19
  Initialization for Modular Service Tool........13
  Initialization Screen........10
  Internal Schedule Optimal Start Soak Multiplier
    Setpoint........33
  Loop Search Screen........11
  Mechanical Heat/Cool Failure Time Period
    Setpoints........31
  MiniLink PD Configuration........55
  Minimum Supply Fan VFD Speed for Heating
    Setpoint........28
  Mod Cool 1 Override........39
  Mod Cool 2 Override........39
  Mod Heating Override........39
  Modulating Cooling/Heating Screen........20
  Modulating Cooling Proportional Window
    Screen........21
  Modulating Cooling Reverse Acting Screens........21
  Modulating Heating Output Signal Screen........20
  Modulating Heating Proportional Window
    Screen........20
  Modulating Heating Reverse Acting Screen........20
  Morning Warm Up Temp Setpoint........28
  Multiple Digital Compressors........21
  Outputs Force Screen........38
  Overrides Screen........12,14
  Preheat/Low Ambient Temperature Setpoint........31
  Proof of Flow Input Screen........20
  Push-Button Override Duration Setpoint........32
  Relay Configuration Screens........24
  Relay Overrides........39
  Reset Interval Rate........18
  Reversing Valve Active During Heat/Cool........21
  SA Configuration Screens........18
  SA Controller Status Screens........40
  SAT Cooling Setpoints........26
  SAT Heating Setpoints........27
  Schedule Override........36
  Sensor Calibration for COIL........34
  Sensor Calibration for EAT & EWT........33
  Sensor Calibration for SPC & SAT........33
  Set Time & Date Screens........36
  Space Sensor Overrides Screen........12
  Stage Control Window Setpoints........28
  Static Setpoint, Deadband & Control Rate Set-
    points........30
  Supply Fan Cycle Screen........18
  Supply Fan Starting Delay Timer Setpoint........31
  Trend Log Interval Setpoint........33
  Unit Selection Screens........9
  Unoccupied Cooling & Heating Setbacks
    Setpoints........26
  Uses R410A........23
  VAV/Zone Box Configuration........46
  VAV/Zone Configuration........46
  VAV/Zone Controller Setpoints........48
  VAV/Zone Damper Force Modes........54
  VAV/Zone Damper Operation........46
  VAV/Zone Status........52
  Water Cooled Condenser........21
  Water Side Economizer Control Screen........19
  Water Side Economizer Setpoints........30
  Water Side Variable Flow........19
  Week Schedules........35
  WSE Bypass A Override........39
  WSE Bypass B Override........39
  Search
    For Loops........11
    For Overrides........12
  Selection Buttons
    Defined........9
  Sensor
    EAT & EWT Setpoint........33
  Sensor Calibration
    COIL........34
    Space Temperature........51
    SPC & SAT Setpoint........33
    Supply Air Temperature........51
  Sensor Calibration for EAT & EWT........33
  SERIES FAN BOX
    VAV/Zone........46
  Setpoints
    Adaptive Defrost Adjustment Setpoint........33
    Button........9,18,25,46,54
    Cool Reset Source........26
    Cutoff Temperature........28
    Defrost Temperature........32
    Dehumidification Coil Temperature........29
    Dehumidification Indoor RH & Entering Air
      Dewpoint........29
    Delta Setpoint........30
    Entering Air Lockouts........28
    Head Pressure Cooling Setpoint........29
    Head Pressure Output Minimum Position
      Setpoint........30
    Head Pressure Reheat Setpoint........29
    Heat Pump Auxiliary Heating Delay........32
    Heat Pump Defrost Setpoints........32
    Heat Reset Source........27
    HVAC Mode Select Deadband........26
    HVAC Mode Sensor Slide Offset........32
    HVAC Mode Setpoints........26
    HVAC Schedule........31
    Internal Schedule Optimal Start Soak Multiplier........33
    Mechanical Heat/Cool Failure Time Period........31
<table>
<thead>
<tr>
<th><strong>S-T</strong></th>
<th><strong>Index</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Supply Fan VFD Speed For Heating</td>
<td>28</td>
</tr>
<tr>
<td>Morning Warm Up Temp</td>
<td>28</td>
</tr>
<tr>
<td>Preheat Ambient Temperature</td>
<td>31</td>
</tr>
<tr>
<td>Push-Button Override Duration</td>
<td>32</td>
</tr>
<tr>
<td>SAT Cooling Setpoints</td>
<td>26</td>
</tr>
<tr>
<td>SAT Heating Setpoints</td>
<td>27</td>
</tr>
<tr>
<td>Screen Index</td>
<td>25</td>
</tr>
<tr>
<td>Sensor Calibration for COIL</td>
<td>34</td>
</tr>
<tr>
<td>Sensor Calibration for EAT &amp; EWT</td>
<td>33</td>
</tr>
<tr>
<td>Sensor Calibration for SPC &amp; SAT</td>
<td>33</td>
</tr>
<tr>
<td>Stage Control Window</td>
<td>28</td>
</tr>
<tr>
<td>Static Setpoint, Deadband &amp; Control Rate</td>
<td>30</td>
</tr>
<tr>
<td>Supply Fan Starting Delay Timer</td>
<td>31</td>
</tr>
<tr>
<td>Trend Log Interval</td>
<td>33</td>
</tr>
<tr>
<td>Unoccupied Setbacks</td>
<td>26</td>
</tr>
<tr>
<td>Water Side Economizer Setpoints</td>
<td>30</td>
</tr>
</tbody>
</table>

**Setpoint Screens**

<table>
<thead>
<tr>
<th><strong>Index</strong></th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Time &amp; Date</td>
<td>36</td>
</tr>
<tr>
<td>Setting</td>
<td>37</td>
</tr>
<tr>
<td>Date</td>
<td>37</td>
</tr>
<tr>
<td>Day of Week</td>
<td>37</td>
</tr>
<tr>
<td>Month</td>
<td>37</td>
</tr>
<tr>
<td>Year</td>
<td>37</td>
</tr>
<tr>
<td>Slide Adjust</td>
<td>41</td>
</tr>
<tr>
<td>Slide Offset</td>
<td>52</td>
</tr>
<tr>
<td>VAV/Zone Status</td>
<td>52</td>
</tr>
<tr>
<td>Smoke Detector</td>
<td>15, 16</td>
</tr>
<tr>
<td>Smoke Detector Input</td>
<td>22</td>
</tr>
<tr>
<td>Software</td>
<td>10</td>
</tr>
<tr>
<td>Current Version</td>
<td>10</td>
</tr>
<tr>
<td>Space Sensor Overrides Screen</td>
<td>12</td>
</tr>
<tr>
<td>Space Temperature</td>
<td>41</td>
</tr>
<tr>
<td>Configuration</td>
<td>18</td>
</tr>
<tr>
<td>HVAC Reset Source</td>
<td>18</td>
</tr>
<tr>
<td>Space Temperature Return Air and Slide Adjust</td>
<td>41</td>
</tr>
<tr>
<td>SA Controller Status</td>
<td>41</td>
</tr>
<tr>
<td>Space Temperature Sensor</td>
<td>40</td>
</tr>
<tr>
<td>SPC</td>
<td>33</td>
</tr>
<tr>
<td>Stage Control Window Setpoints</td>
<td>28</td>
</tr>
<tr>
<td>Staging Up and Down Delay Periods</td>
<td>23</td>
</tr>
<tr>
<td>Stand-Alone</td>
<td>13</td>
</tr>
<tr>
<td>Configuration</td>
<td>7</td>
</tr>
<tr>
<td>Connection</td>
<td>10, 13</td>
</tr>
<tr>
<td>Start and Stop Times</td>
<td>35</td>
</tr>
<tr>
<td>2359</td>
<td>35</td>
</tr>
<tr>
<td>ZERO</td>
<td>35</td>
</tr>
<tr>
<td>Static Pressure</td>
<td>42</td>
</tr>
<tr>
<td>Output % SA Controller Status</td>
<td>42</td>
</tr>
<tr>
<td>SA Controller</td>
<td>42</td>
</tr>
<tr>
<td>Static Spt, Deadband &amp; Control Rate Setpoints</td>
<td>30</td>
</tr>
</tbody>
</table>

**Status**

<table>
<thead>
<tr>
<th><strong>Button</strong></th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key</td>
<td>9</td>
</tr>
</tbody>
</table>

**Status Screens**

| Head Pressure Condenser Fan #1 | 44, 45 |
| Suction Pressure | 29 |
| Suction Pressure Transducer | 29, 42 |

**Supply Air**

| Configuration | 18 |
| Setpoint Reset | 16 |
| Temperature | 52 |

**Supply Air Control**

| SUPPLY AIR CUTOFF! | 40 |
| Supply Air Temperature Reset | 18 |
| Supply Air Temperature & Setpoint | 40 |
| Supply Fan | 18 |
| Cycle Screen | 18 |
| Starting Delay Timer Setpoint | 31 |

**System**

| Status | 56 |
| Type | 55 |

**System Manager**

| Connection Diagram | 5 |
| Dimensions | 3 |
| Initialization Screens | 10 |
| Mode Selection Buttons | 9 |
| Override Search | 12 |
| Passcodes | 12 |
| SA Controller Setpoints | 25 |
| Setpoints Button | 18 |

**T**

**Testing the System**

| Outputs Force | 38 |

**Time**

| 24-Hour Military Format | 35 |
| Daylight Savings | 37 |

**Troubleshooting the System**

| Outputs Force | 38 |
| Two Condenser Head Pressure Module | 44, 45 |
Index

U

Unit ID
Entering...........9
for Network System...........9
Stand Alone System..........9
Unit Selection Screen...........9

Unoccupied
Cooling & Heating Setbacks Setpoints.........26
Mode...........36
Setbacks..........48
Unoccupied Mode..........40

V

VAV Operation
Programming........15
VAV/Zone
AHU Heat Call Space Temperature..........48
Box Heat Allow...........47
Configuration...........46
Controllers...........46
COOLING ONLY BOX...........46
Damper Airflow
 Cool/Heat Minimum..........49
Integral..........48
Maximum..........48
Vent Minimum.........48
Damper Airflow Fixed Position.........49
Damper Airflow Night Minimum.........49
Damper Airflow Reheat Minimum.........49
Damper Force Modes.........54
Day/Night Schedule.........50
Dump Zone.........47
Expansion Relays Heating Stages.........47
H/C CHANGEOVER BOX.........46
Main Fan Status.........47
Maximum EMS Offset.........50
Maximum Slide Offset.........50
Occupied Setpoints.........48
PARALLEL FAN BOX.........46
Pressure Independent Airflow Constant.........46
Proportional Heating Signal.........47
Push-Button Override.........47
Push-Button Override Duration.........50
Sensor Calibration for Space Temperature.........51
Sensor Calibration for Supply Air Temperature.........51
SERIES FAN BOX.........46
Unoccupied Setbacks.........48
Voting Zone.........46
Zone Alarm Delay.........50
Zone Alarm Offsets.........50

VAV/Zone Configuration
Damper Operation..........46
VAV/Zone Controllers.........38
VAV/Zone Setpoints
AHU Heat Call Space Temperature..........48
Damper Airflow
 Cool Minimum..........49
Heat Minimum..........49
Integral..........48
Maximum..........48
Vent Minimum..........48
Damper Airflow Fixed Position.........49
Damper Airflow Night Minimum.........49
Damper Airflow Reheat Minimum.........49
Day/Night Schedule.........50
Fan On Min..........49
Maximum EMS Offset.........50
Maximum Slide Offset.........50
Occupied Setpoints.........48
Push-Button Override Duration.........50
Sensor Calibration for Space Temperature.........51
Sensor Calibration for Supply Air Temperature.........51
Unoccupied Setbacks.........48
Zone Alarm Delay.........50
Zone Alarm Offsets.........50

VAV/Zone Status
Airflow..........53
Alarm Status..........53
Box Air Temperature..........52
Cooling Setpoints..........52
Desired CFM..........53
Fan Status..........53
Heating/Cooling Demand..........52
Heating Setpoints..........52
Mode of Operation..........52
Reheat Stages..........53
Screens..........52
Slide Offset..........52
Supply Air Temperature..........52
Zone Damper Position..........53
Zone Temperature..........52

VFD...........18
Voting Zone Configuration...........46
W

Warm-up Mode Relay.......45
Warm-up Mode Relay Configuration.......24
Water Cooled Condenser Screen.......21
Water Side Economizer.......42
    Bypass Valve Positions.......43
    Control Screen.......19
    Relay Configuration.......24
    Valve Position.......42
    Water Temperature.......42
Water Side Economizer Setpoints.......30
Water Side Variable Flow Screen.......19
Water Source Heat Pump Protection Module.......44
Water Source Heat Pump Unit.......44
Water Temperature.......42
Week Schedules
    SA Controller.......35
Wiring
    Power/Comm Board.......6
WSE Bypass A Override.......39
WSE Bypass B Override.......39

Y

Year.......37

Z

Zone Alarm
    Delay.......50
    Offsets.......50
Zone Damper Position
    VAV/Zone Status.......53
Zone Demand!.......40
Zone Temperature
    VAV/Zone Status.......52