



**TRANE®**

# Controller Operator Guide

---

## VariTrac™ Central Control Panel



---

**VAV-SVU01A-EN**



### *VariTrac Central Control Panel Operation Guide*

This guide and the information in it are the property of American Standard Inc. and shall not be used or reproduced in whole or in part, except as intended, without the written permission of American Standard Inc. Since Trane has a policy of continuous product improvement, it reserves the right to change design and specification without notice.

Use of the software contained in this package is provided under a software license agreement. Unauthorized use of the software or related materials discussed in this manual can result in civil damages and criminal penalties. The terms of this license are included with the compact disc. Please read them thoroughly.

Trane has tested the system described in this manual. However, Trane does not guarantee that the system contains no errors.

Trane reserves the right to revise this publication at any time and to make changes to its content without obligation to notify any person of such revision or change.

Trane may have patents or pending patent applications covering items in this publication. By providing this document, Trane does not imply giving license to these patents.

The following are trademarks or registered trademarks of Trane: Comfort Manager, Reliatel, Tracker, Trane, VariTrac, VariTrane, and Voyager.

Windows is a registered trademark of Microsoft Corporation.

Printed in the U.S.A.

# Contents

---

<b>Chapter 1</b>	<b>About This Guide .....</b>	<b>1</b>
	VariTrac CCP Naming Conventions .....	1
	Cautionary Statements .....	2
	Related Literature .....	2
<b>Chapter 2</b>	<b>VariTrac History .....</b>	<b>3</b>
<b>Chapter 3</b>	<b>Feature Summary .....</b>	<b>5</b>
	New Features .....	5
	Functional Enhancements .....	6
	Increased Zone Count .....	6
	Discharge Air Control .....	6
	Supply Air Tempering .....	6
	Feature Summary .....	6
	CO <sub>2</sub> Based Demand Control Ventilation .....	6
	Zone Occupied Standby Function .....	6
	System Balance Mode .....	6
	Global Sensor Setpoint Limit Set-up .....	6
<b>Chapter 4</b>	<b>Software Change History .....</b>	<b>7</b>
<b>Chapter 5</b>	<b>General Information .....</b>	<b>9</b>
	Central Control Panel .....	9
	Communicating Sensor–Bypass Control Assembly .....	9
	Bypass Damper(s) .....	10
	Zone Damper with a UCM and Zone Temperature Sensor .....	10

**Chapter 6 Sequence of Operation ..... 11**

- Central Control Panel ..... 11
  - CCP Start-up ..... 11
  - Bypass System Calibration ..... 11
  - Static Pressure Bypass ..... 12
  - Heat/Cool Mode Decision for Zones ..... 12
  - Zone Voting for System Heat or Cool ..... 13
  - UCM Zone Tagging for No Vote ..... 13
  - Zone Heat/Cool Call Strength ..... 14
  - Heat/Cool Decision for the CCP ..... 14
  - Heat/Cool Changeover for the CCP ..... 15
  - Heat/Cool Changeover from Opposite Strong Callers ..... 15
  - Heat/Cool Staging and Discharge Air Control ..... 15
  - Morning Warm-Up/Precool Mode ..... 16
  - Manual Heat/Cool Mode Control ..... 16
  - Priority Shutdown ..... 17
  - Voyager/Reliatel Rooftop Operation versus Binary Output Control ... 17
  - 2 Heat/2 Cool versus Heat Pump Operation ..... 18
  - Spare Binary Output Control ..... 18
  - Auxiliary Heat Lockout ..... 18
  - Occupied Priority Local Heat ..... 18
  - Unoccupied Priority Local Heat ..... 19
  - Unoccupied Control ..... 19
  - VariTrac CCP Group Functions ..... 20
    - Group Occupied/Unoccupied ..... 20
    - Timed Override ..... 21
    - Group Overrides ..... 21
  - System Balance Mode ..... 22
  - CO<sub>2</sub> -Based Demand Control Ventilation ..... 22
  - Global Sensor Setpoint Limit Setup ..... 23



**Chapter 6**  
**cont'd**

Unit Control Module (UCM) .....	23
UCM Start-Up .....	23
Setpoints .....	24
Parameters .....	25
Damper Control .....	25
Heat/Cool Mode Decision for Zones .....	26
Local Heat Control .....	26
Priority Local Heat .....	27
Stand-alone Control .....	27
UCM CO2 Input for VariTrac Demand-Controlled Ventilation .....	28
Occupied/Unoccupied Mode .....	29
UCM Zone Occupied Standby Function .....	29
Drive to Maximum .....	29
Override to Unoccupied .....	30
Failure Modes .....	30
UCM Interface .....	30
Zone Sensor Operations .....	31
Zone Temperature .....	31
Zone Setpoint Control .....	31
Timed Override and Cancel .....	31
Modem Interface for Remote Communications .....	32
Modem Requirements for the VariTrac CCP .....	32
Configuring the External Modem .....	32
Connecting the Modem to the VariTrac CCP .....	32
Modem Operation .....	33
VariTrac CCP Interface .....	33
CCP Operator Display .....	33
VariTrac PC Software .....	33
Tracker Version 10 Panel .....	33

<b>Chapter 7</b>	<b>Delivered VAV Operation .....</b>	<b>35</b>
	What “Delivered VAV” Is .....	35
	What “Delivered VAV” Is Not .....	35
	System Operating Overview .....	36
	Zone Count .....	36
	Automatic Configuration and Start-up .....	36
	Morning Warm-Up .....	36
	Supply Air Temperature Control .....	36
	Supply Air Setpoint Reset .....	37
	Daytime Warm-Up .....	37
	Unoccupied Control .....	37
	Supply Air Pressure Control .....	38
	Supply Air Pressure Limiting .....	38
	Fan Pressure Optimization .....	38
	Power Exhaust Control .....	38
	CO <sub>2</sub> -Based Demand-Controlled Ventilation .....	39
	System Calibration .....	39
	Zone Occupied Standby Function .....	39
	Global Sensor Setpoint Limit Setup .....	40
	System Balance Mode .....	40
<b>Chapter 8</b>	<b>Using the Operator Display .....</b>	<b>41</b>
	Overview .....	41
	Screen Layout .....	42
	Title Bar .....	42
	Navigation Buttons .....	42
	Selection Buttons .....	42
	Home Screen .....	44
	Operation Screens .....	45
	Branch Selection Screen .....	45

**Chapter 8**  
**cont'd**

Data Display Screens .....	46
Data Entry Screens .....	46
Analog Data Entry Screen .....	47
Alphanumeric Data Entry Screen .....	48
Confirmation Screens .....	49
View Procedures .....	51
Determine Area Temperature .....	51
Determine Area Temperature Setting .....	51
Adjust Area Temperature Setting .....	52
Determine Area Occupancy .....	53
Acquire Detailed Area Occupancy Schedule Status .....	53
Override Area Occupancy .....	54
Cancel Area Override .....	54
Acquire Detailed Area Status and Setup .....	53
Alarm Procedures .....	54
View VariTrac Diagnostics .....	54
Schedule Procedures .....	61
Change Daily Schedule Name .....	61
Change Daily Schedule Start and Stop Times .....	62
Add Member to Daily Schedule .....	64
Remove Member from Daily Schedule .....	65
View List of Daily Schedules and Check Occupancy .....	66
View a Daily Schedule and Schedule Members .....	66
View Unscheduled Members .....	67
After Hours Procedures .....	69
Start or Restart an Area Timed Override .....	69
Start or Restart Timed Override of a Single Schedule .....	72
Start or Restart All Timed Override Schedules .....	72
Cancel a Single Area Timed Override .....	72
Cancel Timed Override of a Single Schedule .....	73
Cancel Timed Override of All Schedules .....	73

<b>Chapter 9</b>	<b>Advanced Functions .....</b>	<b>75</b>
	CCP Setup and Service .....	75
	CCP Setup .....	75
	Set the CurrentTime .....	76
	Set the Current Date .....	76
	Set the Time Format .....	77
	To Change the Units of Display .....	77
	Service and Testing .....	77
	Operator Display Parameters .....	78
	CCP Hardware and Software Functions .....	80
	System Setup and Status .....	83
	System Setup .....	83
	System Name .....	84
	HVAC Unit Type .....	84
	Control Mode .....	84
	Supply Air Tempering .....	84
	Discharge Cooling Setpoint .....	84
	Discharge Heating Setpoint .....	84
	Minimum Opposite Callers .....	85
	Minimum Opposite Strong Callers .....	85
	Static Pressure Setpoint Multiplier .....	86
	System Balance Mode .....	87
	Adjust Groups for Balance Mode .....	88
	Disabling the System Balance Mode .....	89
	Changing Limits Globally .....	89
	Calibrate Now .....	90
	System Status .....	91

**Chapter 9**  
**cont'd**

Zone Setup and Status .....	96
Zone Setup .....	96
Zone Name .....	97
Heat/Cool Vote .....	97
Use Local Setpoint .....	97
Flow Override .....	97
Unoccupied Cooling Setpoint .....	98
Occupied Cooling Setpoint .....	98
Occupied Heating Setpoint .....	98
Unoccupied Heating Setpoint .....	98
Zone Sensor Setpoint Limits .....	99
Cooling High Limit .....	99
Heating High Limit .....	99
Cooling Low Limit .....	99
Heating Low Limit .....	99
Airflow Maximum Position .....	100
Airflow Cooling Minimum Position .....	100
Airflow Heating Minimum Position .....	100
Local Heat Minimum Position (UCM 4.0 and later) .....	100
Occupancy Sensor Setup (UCM 4.0 and later) .....	101
Aux Sensor Set To (UCM 4.0 and later) .....	101
Zone Status .....	102
Group Setup .....	104
Group Name .....	105
Vent Mode .....	105
Flow Override .....	105
Energy Saver Mode .....	105
View or Edit Current Group Members .....	105



*Table of Contents*



## Chapter 1

# About This Guide

---

This manual describes the steps required to properly set up and operate VariTrac changeover-bypass variable air volume (VAV) systems, delivered VAV systems, and the VariTrac central control panel (CCP). The information in this guide includes:

**VariTrac History.** A brief overview of the VariTrac product history.

**Feature Summary.** A summary of the new features and enhancements of VariTrac (3).

**Software Change History.** A chronology of version changes to the VariTrac CCP embedded software.

**Introduction to VariTrac.** General information about the VariTrac CCP.

**VariTrac Operation Overview.** Basic operation information covering startup, heat/cool decisions, zone controller and zone sensor operations, and modem interface.

**Delivered VAV Operation Overview.** Basic delivered VAV operation information covering startup, heat/cool decisions, zone controller and zone sensor operations, and modem interface.

**Using the Operator Display.** Information and procedures for navigating through the operator display menus, including Home, View, Alarms, Schedules, and After Hours.

**Advanced Functions.** Information for advanced users, including CCP setup and service, system setup and status, zone setup and status, and group setup.

## VariTrac CCP Naming Conventions

The use of the name "VariTrac CCP" in this manual implies the VariTrac central control panel and the VariTrac CCP embedded system software. Where information is unique to one model, that model is specified.

## Cautionary Statements

The following cautionary statements signal procedures or conditions that require particular attention. Personal safety and the proper operation of the system depend upon the strict observance of these precautions.

### **⚠ WARNING**

**Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death.**

### **⚠ CAUTION**

**Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.**

### **CAUTION**

**Indicates a situation in which property-damage-only accidents could occur. It is also used to alert against unsafe practices.**

### **IMPORTANT**

*Alerts installer, servicer, or operator to potential actions that could cause the product or system to operate improperly, but will not likely result in potential for damage.*

## Related Literature

The following literature is referred to or pertains to equipment referred to in this manual.

- VariTrac CCP installation guide, VAV-SVN03A-EN
- VAV UCM installations and operations, VAV-SVX01B-EN
- Voyager service literature
- Reliatel service literature



## Chapter 2

# VariTrac History

---

With the introduction of VariTrac in 1989, Trane brought their expertise in variable air volume (VAV) controls into the changeover-bypass zoning market.

The concept of changeover-bypass zoning brings the flexibility and comfort of VAV systems into the light commercial unitary market, at an affordable price.

The first generation of VariTrac was a 16-zone pressure dependent system. The zone dampers featured the same electronic zone controller Trane developed for its VAV boxes, operating in the pressure dependent mode. The heart of the system was the Comfort Manager™, a panel which was designed to manage the HVAC unit, bypass damper functions, and changeover decisions. The functional concept of this original system continues to be the backbone of today's zoning system.

In the early 90s, two important enhancements were added to the system:

- Trane's new Comm4 communications link for the damper controllers
- The ability to directly communicate with Trane's new Voyager UCP electronic rooftop unit controls

Trane introduced the second generation of VariTrac in 1995. This generation featured the central control panel as the functional replacement for Comfort Manager. The new panel consisted of a resin enclosure, optional relay board for 24 VAC unit control, and a move to static pressure for bypass control. Improved changeover control was added to the operating system, and the zone damper controls were upgraded to UCM Version 3.

Trane introduced a new generation of VariTrac controls in 2002. This generation kept all the great features of the original VariTrac system, plus added new features and enhancements. The enhancements were designed to make the 2002 generation of VariTrac the simplest changeover-bypass zoning system to install, commission, and service of any light commercial controls system available today.



*VariTrac History*



## Chapter 3

# Feature Summary

---

## New Features

- CCP with three-piece enclosure design and optional operator display
- Quick snap-in optional relay board with easy-to-wire terminal strip
- Communicating sensor assembly including a UCM 4 with integral temperature and pressure sensor, and output to the bypass damper(s)
- Bypass damper with factory-installed wiring harness for plug-in connection to the communicating sensor assembly
- Zone dampers with UCM 4 boards and:
  - Zone occupancy sensor input
  - Zone (carbon dioxide) CO<sub>2</sub> sensor input
- New rectangular zone dampers (sizes given in inches):
  - 8×12, 8×14, 8×16
  - 10×16, 10×20
  - 14×18
- Same Comm4 communications to the zone dampers for reliable operation and backward compatibility
- Supports Comm5 communications to the new Tracker Version 10 panel
- Optional touch-screen operator display with built in 7-day time clock
- Windows®-based PC software program for system interface
- Digital display zone temperature sensor
- Pressure-independent box capability
- Local heat capability



## Functional Enhancements

### Increased Zone Count

The new VariTrac system now supports 24 zones instead of 16. The zones may be VariTrac dampers, or any type of VariTrane VAV box including fan-powered boxes or boxes with factory-installed local heat.

### Discharge Air Control

VariTrac now does discharge air control. When there is demand for heating or cooling from a zone, the CCP controls the discharge air temperature to the discharge air setpoint (default 55°F cooling, 110°F heating), using as many stages as necessary.

### Supply Air Tempering

It is now possible to enable the supply air tempering function in a Voyager via the CCP. This allows the Voyager to cycle a stage of heat on and off to warm up the supply air stream and better manage the load created by increased ventilation air requirements.

### CO<sub>2</sub>-Based Demand-Controlled Ventilation

CO<sub>2</sub> sensors can now be connected to VariTrac zone UCMs. The CCP demand control ventilation will reset the ventilation damper position for the Voyager/Precedent unit based on the CO<sub>2</sub> level.

### Zone Occupied Standby Function

A VariTrac UCM can now have an occupancy sensor connected to it. It can be configured to perform an occupied standby function at the zone level during the system occupied mode.

### System Balance Mode

A VariTrac system can be placed in the balance mode from the operator display or the PC software using a single button selection. In this mode, the CCP automatically prepares the VariTrac system for balancing by starting the supply fan, disabling heating and cooling, closing the bypass damper, and opening all zone dampers to their maximum position.

### Global Sensor Setpoint Limit Setup

The VariTrac CCP allows you to create a single set of limits for the zone sensor setpoint thumbwheels and broadcasts them to all the zones on the system at one time by pushing a single button.



## Chapter 4

# Software Change History

---

New software versions add capabilities and improve existing operation. Each new software version includes the features of previous versions. Only the latest software version is shipped in new VariTrac CCP units. Existing units may contain a previous version.

The following information states the history of VariTrac CCP embedded software version changes:

**Version 4.0.284.** Pre-release version of VariTrac (3) central control panel.

**Version 4.0.290.** First release of VariTrac (3) central control panel.

**Version 4.1.296.** Second release version of VariTrac (3) central control panel.

- Corrected CCP to Voyager Commercial occupancy state sync issue when power was cycled at the unit but not at the CCP
- Corrected CCP to Voyager II slave state sync issue when power was cycled at the unit but not at the CCP



*Software Change History*

## Chapter 5

# General Information

---

The VariTrac comfort control system brings individual temperature control to each comfort zone in a building while using the same single-zone air-conditioning unit. VariTrac varies the flow of supply air to each zone, providing the heating and cooling capacity required. The VariTrac changeover-bypass VAV system includes the following components:

- VariTrac central control panel (CCP)
- Communicating sensor–bypass control assembly
- Main supply duct bypass damper(s)
- VariTrac zone dampers with unit control module (UCM) and zone temperature sensor

## Central Control Panel

The CCP provides coordination, monitoring, and diagnostics for the VariTrac zone-control system. It is responsible for communicating with the zone dampers to determine space heating and cooling requirements, and selecting the mode and number of stages for the heating and cooling unit to meet those needs.

The VariTrac CCP is designed to provide coordinated control of up to 24 VAV zones and one air-handling unit. The CCP can be controlled and monitored from an upper level system such as a Tracker Version 10. VariTrac can also function as a stand-alone device with its occupied/unoccupied function initiated by the time clock built into the CCP operator display, or by a binary input from an external time clock or other contact closure.

## Communicating Sensor–Bypass Control Assembly

The communicating duct sensor assembly consists of a static-pressure sensor, supply-air-temperature sensor, and communicating zone UCM board combined into one enclosure. This device performs the following functions:

- Measures the air pressure in the main supply duct
- Monitors the temperature of the air in the main supply duct
- Controls the position of the bypass damper
- Communicates all this information to the CCP

## **Bypass Damper(s)**

The main supply-duct bypass damper(s) are modulated by the CCP via the communicating sensor-bypass control assembly to maintain consistent supply duct static pressure.

## **Zone Damper with UCM and Zone Temperature Sensor**

The zone damper UCM compares the space temperature to the active setpoint to determine space requirements, and to the supply air temperature to determine available heating or cooling. It modulates the damper to provide the proper amount of heating or cooling air to meet comfort conditions.

The zone UCM also provides the VariTrac CCP with information about the current comfort conditions and heating or cooling requirements of the space.

## Chapter 6

# Sequence of Operation

---

## Central Control Panel

### CCP Start-up

The VariTrac CCP executes the following sequence of events on power up:

- 1 Reads the type of rooftop and automatically configures the panel to control the unit.
- 2 Calibrates the bypass control loop. (See Bypass Control, p. 12)
- 3 Scans all UCMs and collects zone information.
- 4 Determines the system operating mode (occupied or unoccupied) and communicates it to all zones (occupied/unoccupied mode).
- 5 Begins normal operation.

### Bypass System Calibration

Upon power-up or a change from the occupied to the unoccupied mode, the bypass system goes through its calibration procedure. If there are no schedules (24-hour operation) in the CCP, the system calibrates approximately once every seven days. During calibration the system performs the following sequence:

- 1 All zones perform a self-calibration function (UCM reset). This calibrates the position of the damper blade, and also does a zero-flow pressure transducer calibration in VariTrane VAV boxes.
- 2 When zone calibration is complete, all zone dampers modulate to their maximum-open position.
- 3 The bypass damper modulates closed; the zero static pressure reading is taken with the fan off.
- 4 The system fan turns on. After 45 seconds, the reference static pressure reading is taken and stored.
- 5 The bypass damper then modulates to 50 percent, and the zones are released from their maximum position.

**Note:** The calibration procedure can be manually started by pushing the Calibrate Now button available on the operator display or via PC software.

**Note:** During the transition from the occupied to unoccupied mode, the CCP checks to see if calibration has been performed for any reason during the last 23 hours. If calibration has already occurred, the previously stored values are used.

## Static Pressure Bypass

The VariTrac CCP controls the bypass damper(s) using measured duct static pressure. The central control panel compares the measured static pressure to the setpoint. This setpoint is determined by taking the reference static determined during calibration, and multiplying it by the static-pressure-setpoint multiplier percent edited in CCP Setup.

If the measured static is *lower* than the static pressure setpoint minus 10 percent, the bypass damper is driven towards the closed position.

If the measured static pressure is *greater* than the static pressure setpoint, the bypass damper is driven towards the open position.

The bypass damper remains stationary if the static pressure is in the *deadband*. The deadband is the area between the static pressure setpoint and the static pressure setpoint, minus 10 percent.

The bypass damper can be repositioned up to four times per minute. When the bypass damper is repositioned open, it moves 8 percent each time. When the bypass damper is repositioned closed it moves 5 percent each time.

If the *static sensor fails*, the bypass damper is driven to the fail-safe position of 50 percent and the system continues to operate.

When the zone is *unoccupied*, the bypass damper is driven to 50 percent.

## Heat/Cool Mode Decision for Zones

The heat/cool control mode for the individual zones is determined by the zone damper UCM. The central control panel sends the current supply air temperature to all the zone UCMs approximately once every 15 seconds. The zone UCM compares the supply air temperature of the system to the individual zone temperature and the zone setpoint.

If the supply air temperature is:

- less than or equal to the zone temperature, the control action is *cool*.
- greater than or equal to the zone temperature plus 10°F, the control action is *heat*.

If the supply air temperature is between the zone temperature and zone temperature plus 10°F, and the zone temperature is:

- above the cooling setpoint, the control action is *heat*.
- below the heating setpoint, the control action is *cool*.
- between the heating and the cooling setpoints, the control action remains *unchanged*.



## **Zone Voting for System Heat or Cool**

Each zone attached to the VariTrac CCP can “vote” for heating or cooling. A zone is eligible to vote if it:

- is in communication with the central control panel.
- has a valid zone temperature reading.
- is edited to be a voter in the UCM setup.
- is not tagged by the central control panel. (See UCM Zone Tagging below.)

Each zone gets one vote. Occupied and unoccupied zones have the same voting rights.

## **UCM Zone Tagging for No Vote**

A UCM zone is tagged and excluded from the voting decision if the:

- VariTrac system is not in morning warm-up or precool.
- zone is receiving its desired supply air (heating/cooling).
- zone temperature is furthest away from setpoint of all voting zones receiving the desired supply air.
- zone temperature remains three or more degrees away from setpoint for 60 minutes.

A tagged zone continues to operate and communicate normally but cannot vote for heat or cool. This prevents one zone from driving the comfort of all other zones if its setpoints or load cannot be satisfied.

The zone becomes an eligible voter when:

- it returns to within 1°F of its active setpoint.
- the system becomes unoccupied
- UCM tagging is disabled.

Tagged zones are displayed in the service summary of the PC software.

## Zone Heat/Cool Call Strength

After the heat/cool mode of the zone is decided, the strength of its heating or cooling call is determined.

- **Cool caller.** A UCM becomes a “cool caller” if it is a voting UCM and its zone temperature is more than 1°F above the active cooling setpoint. A UCM loses its cool caller status if it becomes a non-voter or if its zone temperature is less than the active cooling setpoint plus 0.5°F.
- **Strong cool caller.** A UCM becomes a “strong cool caller” if it is a voting UCM and its zone temperature is more than 2°F above the active cooling setpoint. A UCM loses its strong cool caller status if it becomes a non-voter or if its zone temperature is less than the active cooling setpoint plus 1°F.
- **Heat caller on a UCM with no local heat or Priority Local Heat edited to Off.** A UCM becomes a “heat caller” if it is a voting UCM and its zone temperature is more than 1°F below the active heating setpoint. A UCM loses its heat caller status if it becomes a non-voter or if its zone temperature is greater than the active heating setpoint minus 0.5°F.
- **Strong heat caller on a UCM with no local heat or priority local heat edited to off.** A UCM becomes a “strong heat caller” if it is a voting UCM and its zone temperature is more than 2°F below the active heating setpoint. A UCM loses its strong heat caller status if it becomes a non-voter or if its zone temperature is greater than the active heating setpoint minus 1°F.
- **Heat caller on a UCM with local heat and Priority Local Heat edited to On.** A UCM becomes a heat caller if it is a voting UCM, its local heat has not been disabled by the CCP, and its zone temperature is more than 2°F below the active heating setpoint. A UCM loses its heat caller status if it becomes a non-voter or if its zone temperature is greater than the active heating setpoint minus 1.5°F.
- **Strong heat caller on a UCM with local heat and Priority Local Heat edited to On.** A UCM becomes a strong heat caller if it is a voting UCM, its local heat has not been disabled by the CCP, and its zone temperature is more than 3°F below the active heating setpoint. A UCM loses its strong heat caller status if it becomes a non-voter or if its zone temperature is greater than the active heating setpoint minus 2°F.

## Heat/Cool Decision for the CCP

The central control panel scans all zones continuously (once every 10 to 20 seconds) and determines the quantity and the strength of all heating and cooling calls. At power-up and on transition from unoccupied to occupied, the greater number of heat or cool calls determines the mode of the CCP and the air-conditioning system. If the votes are tied, the system defaults to heat.

## Heat/Cool Changeover for the CCP

After the heating/cooling decision is determined, the VariTrac CCP requires a minimum number of opposite calls to change over. This is an editable setup parameter with a range of 1 to 4 (factory default is 2). All current callers must be satisfied before the system is allowed to change over. A minimum time between changeovers is enforced. (The editable setup parameter has a range of 10 to 60 minutes; the factory default is 15 minutes.) The counter begins running immediately after a changeover occurs and must expire before changeover is allowed. The time remaining on the counter is displayed in the operator display and PC software.

*Example:* The Minimum Opposite Calls to Changeover is set to 2. If the system is in the heating mode and three zones are calling for heat, all three zones must be satisfied. The system changes over if two or more zones are calling for cooling and the changeover timer and all minimum-on/off times are satisfied.

**Note:** During the unoccupied mode (all groups unoccupied), the Minimum Opposite Calls to Changeover functions the same as in the occupied mode.

## Heat/Cool Changeover from Opposite Strong Callers

A heat/cool changeover also occurs if enough opposite strong callers exist. (See Zone Heat/Cool Call Strength, p. 14.) Minimum Opposite Strong Calls to Changeover is an editable setup parameter with a range of 1 to 4 (factory default is 2). All current mode callers *do not* have to be satisfied, but the minimum time to changeover and all minimum on/off timers must expire before changeover is allowed.

**Note:** During the unoccupied mode (all groups unoccupied) the minimum opposite calls to changeover automatically changes to one (1), so any opposite strong caller can initiate a mode change.

## Heat/Cool Staging and Discharge Air Control

If all zones are satisfied, the CCP operates the HVAC unit in the fan-only mode. With a call for heating or cooling from one of the zones, the CCP activates stages of heating or cooling to satisfy the requirement. (See Zone Heat/Cool Call Strength and Heat/Cool Decision for the CCP, p. 14.)

The VariTrac CCP controls supply air temperature using a discharge air control algorithm. The CCP controls to separate cooling (55°F default) and heating (110°F default) discharge air setpoints.

The control algorithm is both deviation- and time-based. During operation, the CCP monitors not only the supply air temperature deviation from setpoint, but also how quickly deviation occurs when a stage is turned off, and how quickly deviation is recovered when a stage is turned on. This allows the CCP to adjust the number of stages required and the stage cycle rate for the most consistent supply air temperature control. The control algorithm always meets the minimum-on and -off time requirements when adjusting stages.

**Table 1:** Minimum On and Off Times (in minutes)

2 Heat / 2 Cool		Heat Pump	
Binary Output	Min On / Min Off	Binary Output	Min On/Min Off
Cool 1	3 min / 3 min	Stage 1	3 min / 3 min
Cool 2	3 min / 3 min	Stage 2	3 min / 3 min
Heat 1	3 min / 3 min	Reversing Valve	4 min / 4 min
Heat 2	3 min / 3 min	Auxiliary Heat	2 min / 1 min

After it is energized, a stage must remain on until its minimum-on time is satisfied. After a stage is turned off, it cannot be turned on again until its minimum-off time is satisfied.

### Morning Warm-Up/Precool Mode

When the first CCP group becomes occupied, the central control panel enters the morning warm-up/precool mode. This mode holds the ventilation air damper closed on the HVAC unit until the system restores the zone temperatures to their occupied setpoints.

On a Voyager/Reliabel unit, the ventilation damper is commanded closed via the comm link. On noncommunicating HVAC systems (relay board control), the ventilation damper is controlled by Spare Output Relay 6.

The mode terminates when half of the occupied voting zones are satisfied or become opposite callers. Morning warm-up also terminates after two hours or if the system heat/cool mode changes. The spare output is energized during morning warm-up and de-energized when morning warm-up terminates.

### Manual Heat/Cool Mode Control

The CCP allows manual heat/cool mode selection via the operator display or PC software. The VariTrac system normally operates in the autochangeover mode. If manual selection of the mode is required, the operator may manually place the system in the heat, cool, off, or auto mode. The system remains in the selected mode until it is manually returned to the auto mode.

## Priority Shutdown

Priority shutdown is initiated by:

- a priority shutdown command from Tracker.
- closing the CCP priority shutdown input.
- failure to detect any communicating zone UCMs.
- failure to detect a communicating sensor-bypass control assembly at Address 33 (changeover bypass mode only).
- failure of the communicating sensor-bypass control assembly discharge air temperature sensor (changeover-bypass mode only).
- a high temperature input alarm from the Voyager high temperature switch input or Reliatel options module.
- failure to detect any voting zones (all zones tagged as “no vote”).

The VariTrac CCP returns to normal operation when the priority shutdown condition is corrected.

Priority shutdown forces the following control actions:

- Turns off the main supply air fan (minimum-on time not enforced)
- Disables all stages of heating and cooling (minimum-on time not enforced)
- Disables all VAV local heat, if present
- Disables all VAV parallel fans, if present
- Drives all VAV dampers to the maximum open position
- Drives the bypass damper(s) to 50-percent open

## Voyager/Reliatel Rooftop Operation versus Binary Output Control

The VariTrac CCP automatically recognizes and communicates directly with a Voyager or Reliatel unit on the communications link. The relay board in the central control panel is not required.

The VariTrac CCP controls Reliatel or Voyager rooftops directly via a Trane communications interface (TCI) mounted in the rooftop unit. The CCP automatically senses whether the Voyager or Reliatel unit is a heat pump.

The VariTrac CCP uses an optional relay board with six binary output relays to control the stages of heating and cooling, and the supply fan on non-Voyager/Reliatel air-conditioning units. The same relay board is used for heat-pump and 2-heat/2-cool operation. When controlling the HVAC unit with the relay board, the unit type (heat pump or 2 heat/2 cool) must be selected using the PC software or operator display. The default is 2 heat/2 cool.

## 2 Heat/2 Cool versus Heat Pump Operation

The VariTrac CCP automatically determines if it is controlling a Reliatel/Voyager 2 heat/2 cool or heat pump unit and configures the operating parameters (such as staging and supply air setpoints). Generic units controlled with the optional relay board must be configured as 2 heat/2 cool or heat pump through the operator display or PC software. This configures the binary outputs to control in the appropriate sequence. Proper relay function by mode is identified in the VariTrac CCP wiring schematic. The system default is 2 heat/2 cool.

## Spare Binary Output Control

The sixth binary output on the optional relay board is an SPDT unpowered spare output relay. An entry in the PC software allows you to choose how the relay is controlled:

- **Ventilation.** The spare output controls the outdoor air damper control. The output is energized when the CCP (all groups) is unoccupied. When the first group becomes occupied, the CCP enters the morning warm-up/precool mode and the spare output remains energized. The mode terminates when half of the occupied voting zones are satisfied or become opposite callers. Morning warm-up also terminates after two hours or if the system's heat/cool mode changes over. The spare output is de-energized when morning warm-up terminates.
- **H/C.** The spare output is *energized* when the CCP is in cooling and *de-energized* when it is in heating.
- **ICS.** The state of the relay is controlled by an upper-level system, such as Tracker or Tracer (currently not supported).
- **CO<sub>2</sub>.** The relay is controlled by the CCP demand-controlled ventilation program and energizes when the CO<sub>2</sub> alarm point is reached. This relay function can be used to reset the position of a ventilation damper on a noncommunicating HVAC unit based on the zone CO<sub>2</sub> level.

## Auxiliary Heat Lockout

Auxiliary heat on heat pump units can be disabled via PC software. When disabled, any stages of auxiliary heat are turned off (minimum-on times are enforced).

## Occupied Priority Local Heat

Occupied priority local heat is controlled via a PC software entry. If occupied priority local heat is enabled, each zone controls the local heat to the heating setpoint for that zone during the occupied mode. In this mode, the zone heats to setpoint with local heat first. The zone becomes a heat caller if the space temperature falls more than 2°F below the zone heating setpoint.

If occupied priority local heat is disabled, each zone controls the local heat to the heating setpoint minus 2°F for that zone during the occupied mode. In this mode, the zone becomes a heat caller when the space temperature falls more than 1°F below the zone heating setpoint. If the space temperature falls to more than 2°F below the zone heating setpoint, the zone heats to setpoint with local heat.



## Unoccupied Priority Local Heat

Unoccupied priority local heat allows the operator to select a different local heat function during the unoccupied mode. Although priority local heat control may be desirable for better comfort control during the occupied mode, it may be desirable for the HVAC unit to have heating priority to save energy when comfort is not as critical during the unoccupied mode.

Unoccupied priority local heat is controlled via an entry in the PC software. If unoccupied priority local heat is enabled during the unoccupied mode, each zone controls the local heat to the unoccupied heating setpoint for that zone. In this mode, the zone heats to setpoint with local heat first. If the space temperature falls more than 2°F below the unoccupied zone heating setpoint, it becomes a heat caller. Only fan-powered VAV boxes operate their local heat with the main supply fan off. Unoccupied local heat calls at the zone level will not energize the main supply fan.

If unoccupied priority local heat is disabled during the unoccupied mode, each zone controls the local heat to the unoccupied heating setpoint minus 2°F for that zone. In this mode, the zone becomes a heat caller when the space temperature falls more than 1°F below the unoccupied zone heating setpoint. If the space temperature falls to more than 2°F below the unoccupied zone heating setpoint, the zone heats to setpoint with local heat.

## Unoccupied Control

The occupancy of the VariTrac system can be determined one of three ways (listed in order of priority, high to low):

- Tracker Version 10 control
- Scheduling via the CCP time clock
- Binary input control

When the VariTrac system is scheduled by Tracker or the CCP operator display, the group scheduling function is available. (See Group Occupied/Unoccupied, p. 20.)

When all groups are in the unoccupied mode, the CCP begins unoccupied control.

When the occupancy mode is determined by the occupied/unoccupied binary input, group scheduling functions are not available. All groups follow the state of the binary occupied/unoccupied input. When a contact closure is made across terminals TB2-8 and -9, the unoccupied mode is initiated for all groups and connected zones.

During unoccupied control, the CCP:

- **begins intermittent fan operation.** During the unoccupied mode, the fan operates only on a demand for heating or cooling. This minimizes the fan operation to save energy.
- **changes the minimum number of strong callers for changeover to one.** During the unoccupied mode, the minimum opposite strong calls for changeover goes to one so any strong caller can change the system over. All other system setup parameters remain the same during the unoccupied mode.
- **disables energy saver and ventilation modes.** The energy saver and ventilation modes require continuous fan operation and are disabled in the unoccupied mode.
- **disables local heat capability at all zones when the fan is off.** During the unoccupied mode local heat is disabled at all zones when the fan in the air handler is off. When the fan is energized local heat is enabled (unless edited to disabled in the PC software).
- **disables the outdoor air damper with the spare binary output** (if the VariTrac CCP has the optional relay board). Many systems require the outside air damper to remain closed during unoccupied operation. The spare binary output on the optional relay board can disable the outside air damper during the unoccupied mode.

## VariTrac CCP Group Functions

The VariTrac CCP allows four groups of zones to be controlled and monitored independently. Each group can have up to 24 members. Any zone can be assigned to any group, but a zone can only be a member of one group at a time. By default, all 24 zones are assigned to Group 1.

### Group Occupied/Unoccupied

Group occupied/unoccupied performs time-of-day scheduling for the VariTrac CCP. This allows zones serving a specific area to be grouped and scheduled together. Each air conditioning system controlled by a central control panel can have up to four separate time-of-day schedules, one for each of the four groups.

If any group is occupied, the central control panel will operate the supply fan and handle zone voting according to occupied parameters.

All four groups must be unoccupied for the CCP to operate using unoccupied parameters. Zones that are members of occupied groups control to occupied setpoints. Zones that are members of unoccupied groups control to unoccupied setpoints.

### Timed Override

If the timed override button on a zone sensor is pressed, all zone members of that group become occupied. The CCP operates the supply fan and handles zone voting according to occupied parameters. Zones that are members of unoccupied groups but on the same CCP, continue to control to unoccupied setpoints.

The VariTrac CCP must collect the zone timed override (TOV) signals from all members in a group into a TOV signal for the group. A cancel signal from any group member is treated as a cancel for the group. The zone that initiated the TOV signal does not need to generate the signal to cancel a group TOV.

If the VariTrac CCP is under Tracker Version 10 control, it passes group TOV signals to the Tracker without taking any control action. The Tracker system then initiates a TOV control action and determines the TOV period length.

If the VariTrac CCP is under local control, a group TOV signal starts a two-hour timer and controls the group to the occupied setpoints. If another group TOV signal is generated, the timer is reset to two hours and the group continues to be controlled to the occupied setpoints. If the timer expires or a cancel TOV signal is generated, the group is released from the timed override control.

### Group Overrides

The VariTrac CCP can override several zone functions as a group from the operator display or PC software:

- **Flow control.** The group flow control defaults to auto. The group member zones modulate their dampers to follow temperature versus setpoint demand. Zone damper position can be manually overridden to continuous open, closed, minimum, or maximum.
- **Energy-saver mode.** When enabled, the energy-saver mode allows zone dampers to close below their minimum (minimum changes to zero). This only occurs if a zone is in the cooling mode with a zone temperature lower than the active heating setpoint, or in the heating mode and with a zone temperature greater than the active cooling setpoint. This feature prevents counterproductive air from entering a zone.
- **Ventilation mode.** When enabled this mode allows dampers to open for greater ventilation. This occurs when the group is occupied and the air conditioning system is in zero energy state (no stages of heating or cooling energized) for more than four minutes. When the ventilation mode is active, the vent flow multiplier is not allowed to drop below 4.0. For example, if the cooling minimum position is set to 10 percent, the damper goes to 40 percent open ( $10\% \times 4.0 = 40\%$ ) during the ventilation mode.
- **Enforce minimum while unoccupied.** "Yes" enforces the minimum positions of the zones during the unoccupied mode; "No" allows the dampers to go fully closed.
- **Fans.** The fans in parallel fan-powered boxes can be enabled or disabled. Series fans cannot be overridden.
- **Local heat.** Zone local heat can be enabled or disabled.

**Note:** *The fans in series fan-powered VAV boxes cannot be overridden, and are not controlled by the occupancy schedule. Series fans only go off when the air valve is fully closed.*

## System Balance Mode

When the system balance mode is enabled, the CCP automatically prepares the VariTrac system for balancing. When enabled, the CCP sets the following parameters:

- Starts the supply fan
- Turns off and disables all stages of heating and cooling
- Closes the bypass damper(s)
- Opens all groups of zone dampers to their maximum position

The system may now be balanced manually as a single-zone system. The balanced mode offers a group override function for the four groups. This function allows a group of dampers to modulate from the maximum position to the closed position to compensate for airside diversity. The CCP remains in the balance mode until the mode is manually disabled. When the system exits the balance mode, all functions return to normal, and a system calibration is performed. The VariTrac system can be placed in the balance mode from the operator display or the PC software.

## CO<sub>2</sub>-Based Demand Controlled Ventilation

The VariTrac CCP demand-control ventilation program resets the ventilation damper position for the Voyager/Reliabel unit based on the zone CO<sub>2</sub> level. The program has four configuration settings:

- CO<sub>2</sub> normal level (ppm)
- Minimum ventilation damper position (%)
- CO<sub>2</sub> peak level (ppm)
- Maximum ventilation damper position (%)

As the zone CO<sub>2</sub> level rises from the normal level to the peak level, the damper position is reset linearly between the minimum damper position and the maximum damper position.

CO<sub>2</sub> sensors may now be connected to VariTrac zone UCMs Version 4.0 or greater. The zone CO<sub>2</sub> concentration is communicated from the zone UCM to the CCP. The program can be configured to use one zone CO<sub>2</sub> sensor as its source, or it can be configured to hunt through all zones with sensors attached and use the highest value. If the VariTrac system is controlling a noncommunicating HVAC unit with the optional relay board, the spare binary output on the relay board can be configured for CO<sub>2</sub> control. In this configuration, the program will energize the relay when the peak CO<sub>2</sub> level is reached and de-energize the relay when the CO<sub>2</sub> concentration returns to the normal level.



## Global Sensor Setpoint Limit Setup

If the setpoint thumbwheel on the zone sensor attached to a zone UCM is enabled, the thumbwheel becomes the active occupied setpoint. The setpoint at the thumbwheel is the active occupied cooling setpoint. The active occupied heating setpoint defaults 3°F below the cooling setpoint. Each zone UCM has a set of setpoint limits that restricts the setpoint range of the sensor knob. These limits default at the extremes, allowing the sensor setpoint to be set anywhere from 45°F to 95°F. Reduce this range to 5°F or less during system commissioning.

The VariTrac CCP allows you to create a single set of limits for the setpoint thumbwheels on the zone sensor and broadcast them to all the zones on the system at one time by pushing a single button. The global limit function can be accessed from the CCP operator display or the VariTrac PC software.

## Unit Control Module (UCM)

### UCM Start-Up

Upon power-up, the UCM executes a reset with the following sequence:

- Recalls its configuration data from nonvolatile memory to determine its identity and setup
- Recalibrates the damper blade (air valve) position and, if present, recalibrates its own pressure transducer and water-valve position
- Begins normal operation

A reset occurs in the UCM after every power failure. The UCM also initiates a reset automatically whenever air valve timing, water-valve timing, or unit size is edited. The calibration process can take as long as 11 minutes, depending on the edited drive time.

After a power failure, the reset starts are delayed by 20 minutes. This is to prevent reset calibration of the UCM from interfering with the calibration of the bypass dampers and static pressure sensor.

The UCM also has a reset initiated automatically by the VariTrac CCP every day during the system calibration process. This process occurs when the system transitions from the occupied to unoccupied mode. If the CCP has no schedules (24-hour operation) the system will calibrate approximately once every seven days. (See Bypass System Calibration, p. 11.)

## Setpoints

Each zone UCM has the following setpoints:

- **Occupied cooling setpoint.** This is the active cooling setpoint when the zone is in the occupied mode and the zone sensor setpoint is disabled.
- **Occupied heating setpoint.** This is the active heating setpoint when the zone is occupied and the zone sensor setpoint is disabled.

***Note:** If the setpoint thumbwheel on the zone sensor is enabled, the thumbwheel determines the active occupied setpoint, subject to limits (see below). The setpoint at the thumbwheel is the active occupied cooling setpoint. The active occupied heating setpoint defaults 3°F below the cooling setpoint. (See Heat Setpoint Offset below.)*

- **Unoccupied cooling setpoint.** This is the active cooling setpoint when the zone is unoccupied.
- **Unoccupied heating setpoint.** This is the active heating setpoint when the zone is in the unoccupied mode.
- **Cooling setpoint low limit.** The cooling setpoint low limit is applied to the active cooling setpoint with no effect on the operator entry of setpoints. When the setpoint is set below the cooling setpoint low limit, the zone uses the cooling low limit as the active cooling setpoint. The zone continues to control normally using this setpoint.
- **Cooling setpoint high limit.** The cooling setpoint high limit is applied to the active cooling setpoint with no effect on the operator entry of setpoints. When the setpoint is set above the cooling setpoint high limit, the zone uses the cooling high limit as the active cooling setpoint. The zone continues to control normally using this setpoint.
- **Heating setpoint high limit.** The heating setpoint high limit is applied to the active heating setpoint with no effect on the operator entry of setpoints. When the setpoint is set above the heating setpoint high limit, the zone uses the heating setpoint high limit as the active heating setpoint. The zone continues to control normally using this setpoint.
- **Heating setpoint low limit.** The heating setpoint low limit is applied to the active heating setpoint with no effect on the operator entry of setpoints. When the setpoint is set below the heating setpoint low limit, the zone uses the heating setpoint low limit as the active heating setpoint. The zone continues to control normally using this setpoint.
- **Heat setpoint offset.** This setpoint has a range of 2°F to 10°F. When a zone-sensor-thumbwheel setpoint is being used, the occupied cooling setpoint will equal the zone sensor setpoint and the occupied heating setpoint will equal the zone sensor setpoint minus the zone sensor heating setpoint offset. The offset defaults to 3°F and is always displayed and editable even if a zone sensor setpoint is not being used.

- **Maximum position setpoint.** This is the maximum position that the damper opens to unless overridden by a drive-open command.
- **Cooling minimum position setpoint.** This is the minimum position the damper closes to when in the cooling mode unless overridden by a drive-closed command or by initiation of the energy-saver mode.
- **Heating minimum setpoint.** This is the minimum position the damper closes to when in the heating mode unless overridden by a drive-closed command.
- **Local heat minimum setpoint.** This is the minimum position the damper closes to when local heat is energized unless overridden by a drive-closed command (available in UCM 4.0 and later). Setpoint must be manually activated to become functional.

## Parameters

Three parameters control the operation of the zone UCM:

- **Control mode.** This parameter tells the zone to operate in the occupied or the unoccupied mode, as dictated by the VariTrac CCP binary input or CCP group command.
- **Control action.** This parameter defines whether the control action of the zone damper will be heating or cooling (i.e., if there is warm or cold air in the supply duct).
- **Position control.** This parameter is a damper (air valve) override per one of the following:
  - Auto (the zone operates to satisfy zone temperature)
  - Drive to minimum position
  - Drive to maximum position
  - Drive to open position
  - Drive to closed position

## Damper Control

The zone continuously monitors the zone temperature, the damper position, and the zone setpoints. With this information, it uses a PI (proportional plus integral) control loop to maintain the heating and cooling setpoints.



## Heat/Cool Mode Decision for Zones

The heat/cool control mode for the individual zones is determined by the zone damper UCM. The CCP sends the current supply air temperature to all zone UCMs approximately once every 15 seconds. The zone UCM compares the supply air temperature of the system to the individual zone temperature and zone setpoint.

If the supply air temperature is:

- less than or equal to the zone temperature, the control action is *cool*.
- greater than or equal to the zone temperature plus 10°F, the control action is *heat*.

If the supply air temperature is between the zone temperature and the zone temperature plus 10°F and the zone temperature is:

- above the cooling setpoint, the control action is *heat*.
- below the heating setpoint, the control action is *cool*.
- between the heating setpoint and the cooling setpoint, the control action will remain *unchanged*.

### Local Heat Control

The UCM has three local heat outputs available to control duct or perimeter heat. The UCM outputs are 12 VA maximum at 24 Vac “wet contacts,” meaning voltage is provided by the UCM transformer. The local heat type has five selections. This selection determines the heating control algorithm used by the UCM. The following tables and descriptions are with priority local heat enabled. If priority local heat is disabled, all values are lowered by 2°F below the heating setpoint. The choices are:

- **None.** No local heat is controlled.

**Note:** *VariTrac dampers factory-configured as CHGR use this type of local heat control.*

- **1-3 stages electric.** Three stages of local electric heat are staged on by space demand. The stages are controlled on/off by the following differentials:

Output 1 (J9)	Output 2 (J10)	Output 3 (J11)
ON heating setpoint	ON 1.0°F below heating setpoint	ON 2.0°F below heating setpoint
OFF 0.5°F above heating setpoint	OFF 0.5°F below heating setpoint	OFF 1.5°F below heating setpoint

**Note:** *If the local heat is configured to “1-3 stages electric” and the VariTrac CCP goes into the heating mode, local heat is disabled. Local heat is also disabled when the HVAC unit supply fan is off. A call for local heat when the supply fan is off will not bring the supply fan on. VariTrac dampers factory configured as ELEC use this type of local heat control.*

- **Slow pulse width modulation.** Pulse-width modulation energizes an electric heat output for some portion of a time window. The time window for slow pulse-width modulation is 3 minutes. The “on” time is based on the percentage of heat required as calculated by the control algorithm of the UCM. The outputs of the UCM are controlled as shown in the following table:

Output 1 (J9)	Output 2 (J10)	Output 3 (J11)
Pulsing Output*	Pulsing Output*	ON when pulse width = 100%
		OFF when pulse width < 50%

**Note:** When heating demand is between 0% to 50% of heating capacity, Output 1 is pulsing, and Output 2 is off. When heating demand is between 50% to 100% of heating capacity, Output 1 is on continuously, and Output 2 is pulsing. If the local heat is configured to “Slow pulse with modulation” and the VariTrac CCP goes into the heating mode, local heat is disabled. Local heat also displays whenever the HVAC unit supply fan is off. A call for local heat when the supply fan is off will not bring the supply fan on.

- **Prop hot water and aux output.** A floating hot water valve controls local heat. An auxiliary 24 Vac output is also available during a call for local heat. The outputs are controlled as follows:

Output 1 (J9)	Output 2 (J10)	Output 3 (J11)
Drives the valve closed	Drives the valve open	ON when pulse width = 100%
		OFF when pulse width < 50%

**Note:** If the local heat is configured to “Prop hot water and aux output” and the VariTrac CCP goes into the heating mode, local heat remains enabled. Local heat is disabled whenever the HVAC unit supply fan is off. A call for local heat when the supply fan is off will not bring the supply fan on.

- **1-3 stages hot water/perimeter.** Three stages are available to control local hot water heat. The outputs are staged on by space demand. The stages are controlled on/off by the following differentials:

Output 1 (J9)	Output 2 (J10)	Output 3 (J11)
ON heating setpoint	ON 1.0°F below heating setpoint	ON 2.0°F below heating setpoint
OFF 0.5°F above heating setpoint	OFF 0.5F below heating setpoint	OFF 1.5°F below heating setpoint

**Note:** If the local heat is configured to “1-3 stages hot water/perimeter” and the VariTrac CCP goes into the heating mode, local heat remains enabled. Local heat is disabled whenever the HVAC unit supply fan is off. A call for local heat when the supply fan is off will not bring the supply fan on. VariTrac dampers factory configured as NCHW use this type of local heat control.

When the UCM calls for local heat to operate, the damper goes to the minimum heating position as edited before the heating output is energized. If using UCM Version 4.0 or greater, a separate minimum local heating position setpoint is available. The UCM goes to this position as edited, provided the setpoint is available and enabled. If the minimum local heating position setpoint is not enabled, the normal minimum heating position is used.

### **Priority Local Heat**

Priority local heat can be controlled via an entry on the VariTrac CCP setup menu. If priority local heat is enabled, zones control their local heat to the heating setpoint for that zone. If priority local heat is disabled, zones control their local heat to the heating setpoint minus 2°F for that zone.

### **Stand-alone Control**

The VariTrac damper can be used on a stand-alone basis. It is not required for the zone to communicate with the VariTrac CCP. Under this condition, the zone uses the duct temperature analog input (auxiliary temperature) to determine the heating or cooling control action. If the zone determines that a communication failure exists or it is being used as a stand-alone device, it will use the auxiliary temperature and the space temperature to determine its control action. If the duct temperature is greater than or equal to the zone temperature plus 10°F, the control action is heat. If the duct temperature is less than or equal to the zone temperature, the control action is cool.

If the zone has a communication failure and has no duct temperature sensor, it controls to the last determined control action.

### **UCM CO<sub>2</sub> Input for VariTrac Demand-Controlled Ventilation**

Zone CO<sub>2</sub> sensors can be connected to VariTrac zone UCMs Version 4.0 or later. The CO<sub>2</sub> sensor is attached to the auxiliary sensor input on the zone UCM. The UCM supports only one auxiliary sensor. You must choose either temperature or CO<sub>2</sub> in the setup menu for the zone UCM. The input defaults to temperature. The UCM does not use the CO<sub>2</sub> sensor for any local control function.

The CO<sub>2</sub> value is communicated to the VariTrac CCP for system use. The CCP demand-controlled ventilation program uses the zone CO<sub>2</sub> information to reset the ventilation damper position for the Voyager/Reliabel unit based on the CO<sub>2</sub> level. (See CO<sub>2</sub>-Based Demand-Controlled Ventilation, p. 23.)

## Occupied/Unoccupied Mode

During occupied operation, the zone controls to the zone-sensor-setpoint thumbwheel if enabled. The setpoint at the sensor is the cooling setpoint; the heating setpoint is 3°F below the cooling setpoint. This heating setpoint offset can be edited in the zone setpoint menu (range 2°F to 10°F). If the zone sensor setpoint thumbwheel is disabled or has failed, the zone will control to the programmed occupied cooling setpoints. The factory defaults are 74°F cooling and 71°F heating. These setpoints can be edited in the zone setpoint menu.

During unoccupied operation, the zone will control to the programmed unoccupied setpoints. These setpoints have factory defaults of 85°F cooling and 60°F heating. The setpoints can be edited in the zone setpoint menu. Zone sensor mounted setpoints are not applicable in the unoccupied mode.

## UCM Zone Occupied Standby Function

A VariTrac UCM Version 4.0 or later can be configured to perform a zone occupied standby function. Occupied standby allows a zone to hold at its unoccupied setpoints until an occupancy sensor signals activity in the zone. The UCM then controls to its occupied setpoints. After space activity ceases, the UCM returns to the occupied standby mode and again controls to its unoccupied setpoints. This function is only active when the VariTrac system is in the occupied mode. This function only affects the behavior of the zone being served by the UCM, and has no impact on the occupied/unoccupied state of the system. If the system is in the unoccupied mode, the UCM functions as it normally would and controls to its unoccupied setpoints.

An occupancy sensor with a normally open (occupied) switch must be connected to the UCM at the terminals marked 24V and BIP. When the UCM senses a contact closure across the 24V and BIP terminals, it places the zone in the occupied standby mode. The function defaults to disabled, and must be enabled in the UCM setup menu to become active. An occupancy sensor with a built-in time delay is recommended to avoid nuisance changeover.

## Drive to Maximum

A zone can be manually overridden from the zone sensor to drive to the maximum position.

**Mechanical sensor.** Rotate the setpoint thumbwheel on the zone sensor to the \* position (fully clockwise) and push the TOV On button. The zone goes to the maximum override position. To release the maximum position override, move the setpoint thumbwheel on the zone sensor from the \* position into the normal setpoint range.

**Digital zone sensor.** Hold the On and Up arrow buttons until the screen goes blank. Release the buttons. The display will show MAX while the zone damper modulates to its edited maximum position. To release the maximum position override, hold down any button until the normal display returns.

## **Override to Unoccupied**

A zone can be manually overridden from the zone sensor to go into the continuous unoccupied mode.

**Mechanical sensor.** Rotate the setpoint thumbwheel on the zone sensor to the \*\* position (fully counterclockwise) and push the TOV On button. The zone goes into the continuous unoccupied mode. To release the continuous unoccupied mode override, move the setpoint thumbwheel on the zone sensor from the \*\* position into the normal setpoint range.

**Digital zone sensor.** Press the On and Down arrow buttons until the screen goes blank. Release the buttons. The display will show UNOCC. The zone will begin continuous unoccupied operation and continue to display UNOCC. To release the continuous unoccupied mode override, hold down any button until the normal display returns.

## **Failure Modes**

Three failure modes exist for the VariTrac UCM:

- Zone sensor failure
- Zone sensor setpoint failure
- Communications failure

## **UCM Interface**

The UCM can be monitored and controlled from the VariTrac central control panel operator display or using a PC with VariTrac PC software.

## Zone Sensor Operations

The zone sensor module utilizes a 10K thermistor element to measure zone temperature. The zone sensor module has the following options:

- Zone temperature
- Zone setpoint control
- Timed override and cancel

### Zone Temperature

Each zone sensor module includes a zone temperature sensor element.

### Zone Setpoint Control

A zone only uses the thumbwheel setpoint on the zone sensor (during occupied times) if the thumbwheel function on the zone sensor is edited to “enable” on the Zone Setup screen.

### Timed Override and Cancel

Press On or Cancel on the zone sensor module to issue timed override commands.

When On is pressed on a zone sensor (shorting the zone temperature sensor circuit), the UCM starts the two-hour timed override timer at the VariTrac CCP. This affects all group members.

When Cancel is pressed for at least two seconds on a zone sensor module, the UCM sends a TOV cancel signal and resets the timed override timer to zero.

Pressing any zone sensor module’s On or Cancel button does not affect the zone temperature reported from the UCM.

**Note:** TOV buttons should be pressed for at least 2 seconds but not more than 15 seconds.

## **Modem Interface for Remote Communications**

If a Tracker Version 10 panel is available and the VariTrac CCP is connected to it, the CCP can be accessed remotely via the Tracker modem using the Tracker PC software. If no Tracker is available, an external modem can be connected to the VariTrac PC port (RJ-12 style socket) for remote site communications.

### **Modem Requirements for the VariTrac CCP**

It is recommended that a 56K baud US Robotics Sportster fax/data external modem be used for VariTrac CCP applications. This is the only modem that has been tested to function properly with the CCP, and is the only modem application Trane will support with VariTrac. A dedicated phone line should be provided for the modem.

### **Configuring the External Modem**

The following configuration must be followed for 56K baud US Robotics fax/data external modem:

- Check the DIP switch settings on the back of the modem.
- Make sure that switches 1, 4, 7, and 8 are down.
- Make sure that all other switches are up.

### **Connecting the Modem to the VariTrac CCP**

Use the following Trane adapters and cables to connect the modem to the central control panel:

- 1** Use the 35914260, RJ12 to RJ12 cable, and the 35914263, 25-pin modem adapter plug.
- 2** The modem should be powered down when making connections to the CCP.
- 3** Plug one end of the RJ12 cable into the central control panel PC port (RJ-12 style socket located on the bottom of the CCP).
- 4** Plug the other end of the RJ12 cable into the 25-pin modem adapter, and attach the adapter to the 25-pin socket on the back of the modem.
- 5** The modem should be powered with the separate power supply transformer shipped with the modem. (See the VariTrac CCP Installation Guide for additional modem cabling and connection information.)



## **Modem Operation**

Power the modem on. The modem is now ready for use with the VariTrac CCP. Remote connection to the modem is done using the VariTrac PC software and selecting the "remote connect" option. The software provides a setup screen to select the comm port for your PC modem, the site name, and the site phone number. Once you are remotely connected to the site, the PC software functions the same as if you were directly connected to the panel on site.

## **VariTrac CCP Interface**

The VariTrac central control panel offers three methods for an operator to interface with the panel:

- CCP operator display
- VariTrac PC software
- Tracker Version 10 panel

### **CCP Operator Display**

The optional operator display is a back-lit, liquid crystal display with touch-screen programming capability. Through the display you can access system status and zone status, and perform basic setup of the zone UCMs and the CCP system operating parameters. The display is designed to give an installer the ability to commission a VariTrac system without requiring a PC. Additionally, the operator display has a seven-day time clock built in to provide stand-alone scheduling capability of the VariTrac system.

If no Tracker system is on the job, the CCP must be ordered with a display. (See Using the Operator Display, p. 41.)

### **VariTrac PC Software**

Advanced setup functions in VariTrac are now accomplished with a new Windows®-based, graphical PC software program. Connection between the PC and the CCP is made with a standard serial port cable connection. Operation of the PC software is supported through online help in the software.

### **Tracker Version 10 Panel**

If the CCP is connected to a Tracker Version 10 panel, all setup and status information for the CCP can be accessed and configured from the Tracker operator display. This allows you to manage multiple VariTrac systems from one location. You may also interface with the CCPs via Tracker PC software either on site or remotely. If Tracker is available, the CCP may have a blank face plate installed instead of an operator display.



*Sequence of Operation*

## Chapter 7

# Delivered VAV Operation

---

## What “Delivered” VAV Is

“Delivered VAV” describes a small-tonnage VAV system made up of three Trane product families:

- Voyager Commercial 27½ to 50-ton VAV packaged rooftop unit
- Up to 32 VariTrane VAV boxes with DDC controls
- VariTrac central control panel with operator display

Delivered VAV only applies to this combination of Trane products.

The heart of the delivered VAV system is the VariTrac CCP, which must include the operator display. The CCP acts as the communications hub of the system. It is responsible for coordinating the actions of both the VAV rooftop unit and the VAV boxes to meet zone comfort requirements.

The Voyager rooftop unit must be a VAV model with factory-installed inlet guide vanes or variable-frequency drive, microprocessor controls, and Trane communications interface.

Delivered VAV supports up to 32 VariTrane, pressure-independent VAV boxes with the DDC controls. They can be single-duct boxes or fan-powered boxes, and can have factory-installed local heat, if desired.

## What “Delivered VAV” Is Not

Delivered VAV is *not* changeover-bypass VAV. Delivered VAV is a true pressure-independent VAV system. Although the VariTrac CCP is used as the heart of the system, it is not a VariTrac system. There is no bypass damper in a delivered VAV system.

As in any VAV application, the supply fan in the Voyager rooftop unit runs at full constant volume whenever it goes into the heating mode. For this reason, unit heat is only used for morning warm-up and daytime warm-up modes. In both of these modes, the VAV boxes are commanded to maximum flow. If individual zone heating is required during normal daytime operation, a local heat source must be provided at the box.



## System Operating Overview

### Zone Count

A delivered VAV system supports up to 32 zones. The zones can be any type of VariTrane pressure-independent VAV box, including single-duct boxes, fan-powered boxes, and boxes with factory-installed local heat.

### Automatic Configuration and Start-up

The delivered VAV system performs automatic configuration on start-up. The CCP first locates the Voyager rooftop unit on the Comm4 link and automatically configures the system as a delivered VAV system. The CCP then locates all the VAV boxes on the communications link and creates a database of zones, complete with default names. The CCP takes control of all the VAV boxes and calibrates them. It then begins heating/cooling operation.

### Morning Warm-Up

Morning warm-up is done using the zone sensor from Zone 1. A different zone can be selected using the VariTrac PC software. When the system switches from unoccupied to occupied operation, morning warm-up is activated if the zone temperature is more than 1.5°F below the morning warm-up setpoint. The default morning warm-up setpoint is 68°F, and is editable from the PC software and the operator display.

During morning warm-up, all VAV boxes are driven to the maximum flow, the air-handling unit supply fan operates at 100 percent, the economizer is held closed, and heat is cycled on. When the zone temperature meets or exceeds the morning warm-up setpoint, the system switches to the cooling mode. Morning warm-up defaults to enabled and can be disabled through the operator display or PC software.

### Supply Air Temperature Control

The microcontrols in the Voyager rooftop unit are used to control the supply air temperature. The supply air setpoint can be adjusted through the operator display or PC software. If outdoor air conditions are acceptable, the economizer controls are utilized for cooling. If outdoor conditions are unacceptable, mechanical cooling cycles as if the unit has no economizer.



## Supply Air Setpoint Reset

The supply air temperature setpoint can be reset based on zone temperature, return air temperature, or outdoor air temperature. The reset type can be selected and enabled, and the operating parameters can be set through the operator display or PC software. During setup a reset setpoint and reset amount are provided by the operator.

**Reset from zone air.** If the zone air temperature falls below the reset setpoint, supply air setpoint reset begins. As the zone air temperature falls below the reset setpoint by 3°F (fixed), the supply air temperature increases by the reset amount entered by the operator (5°F default).

**Reset from return air.** If the return air temperature falls below the reset setpoint, supply air setpoint reset begins. As the return air temperature falls below the reset setpoint by 3°F (fixed), the supply air temperature increases by the reset amount entered by the operator (5°F default).

**Reset from outdoor air.** If the outdoor air temperature falls below the reset setpoint, supply air setpoint reset begins. As the outdoor air temperature falls below the reset setpoint by 20°F (fixed), the supply air temperature increases by the reset amount entered by the operator (5°F default).

## Daytime Warm-Up

Daytime warm-up applies during the occupied period if the selected zone temperature falls below the "initiate daytime warm-up" setpoint. Mechanical cooling is disabled, the economizer drives to its minimum position, and rooftop heating is cycled to satisfy the daytime warm-up setpoint (Tracer heating setpoint). Mechanical cooling remains disabled until the daytime warm-up termination setpoint is reached. During the daytime warm-up mode, all VAV boxes provide maximum flow and the air-handling unit supply fan operates at 100 percent. Daytime warm-up default is Zone 1 and is enabled and configured through the operator display or PC software. The Tracer heating setpoint and the termination setpoint are usually set the same to minimize the effect on total zone comfort.

## Unoccupied Control

Unoccupied control is done using the zone sensor from Zone 1. A different zone can be selected using the PC software. The schedule for occupancy can be determined using the seven-day time clock built into the CCP operator display, or from Tracer Version 10. When the system switches from occupied to unoccupied operation, the unit operates as a constant-volume unit. On a call for heat or cool, all VAV boxes are driven to the maximum flow and the air-handling unit supply fan operates at 100 percent. The unoccupied setpoints programmed into the Zone 1 UCM are used for unoccupied control.



## **Supply Air Pressure Control**

The factory-installed controls in the Voyager rooftop unit are used for supply air pressure control and pressure limiting. Control is done using a variable-frequency drive or supply-fan inlet guide vanes. The setpoint and deadband for supply air pressure control are configured through the operator display or PC software.

## **Supply Air Pressure Limiting**

The factory-installed controls in the Voyager rooftop unit are used for supply air pressure limiting. If the supply air pressure exceeds the fixed supply air static pressure limit of 3.5 in. wc, the supply fan is shut down and flow (inlet guide vanes or VFD) is set to minimum. The unit is allowed to restart four times. If the over-pressurization condition occurs on the fifth restart, the unit shuts down and a manual reset diagnostic occurs.

## **Fan Pressure Optimization**

Fan pressure optimization is a function that automatically reduces supply fan volume until the VAV damper position in the zone of greatest demand is between 85 percent and 94 percent of maximum flow. This zone is determined automatically by the delivered VAV system CCP. The fan remains at this volume as long as the VAV damper position remains between 85 percent and 94 percent. If the VAV closes below 85 percent, the fan resets to a lower volume. If the zone opens above 95 percent of maximum flow, the fan volume is reset upward. Fan pressure optimization can be enabled from the operator display or PC software.

## **Power Exhaust Control**

The unit-mounted power exhaust fan starts when the supply fan is on and the position of the outdoor air dampers meets or exceeds the exhaust fan setpoint. The exhaust fan setpoint defaults to 25 percent and is set from the operator display or PC software.

## CO<sub>2</sub> -Based Demand-Controlled Ventilation

The demand-controlled ventilation program resets the ventilation damper position for the Voyager unit based on the zone CO<sub>2</sub> level. The program has four configuration settings:

- CO<sub>2</sub> normal level (ppm)
- Minimum ventilation damper position (%)
- CO<sub>2</sub> peak level (ppm)
- Maximum ventilation damper position (%)

As the zone CO<sub>2</sub> level rises from the normal level to the peak level, the damper position is reset linearly between the minimum damper position and the maximum damper position.

CO<sub>2</sub> sensors can now be connected to VariTrane zone UCMs Version 4.0 or greater. The zone CO<sub>2</sub> concentration is communicated from the zone UCM to the CCP. The program can be configured to use one zone CO<sub>2</sub> sensor as its source, or it can be configured to hunt through all zones with sensors attached and use the highest value.

## System Calibration

Upon power-up or a change from the occupied to the unoccupied mode, the system goes through a calibration function. If the CCP has no schedules (24-hour operation), the system calibrates approximately once every seven days. The calibration procedure can be manually started by pushing the Calibrate Now function button available on the operator display or via PC software. During calibration, all VAV UCMs are issued a reset command to perform a self-calibration (zero flow) function.

**Note:** During the transition from the occupied to unoccupied mode the CCP checks to see if calibration has been performed for any reason during the last 23 hours. If calibration has occurred, calibration is skipped, and the previously stored values is used.

## Zone Occupied Standby Function

A VariTrane VAV UCM can now have an occupancy sensor connected to it, and it can be configured to perform an occupied standby function. This mode is available whenever the delivered VAV system is in the occupied mode. If no motion is detected by the zone occupancy sensor, the unoccupied setpoints remain in effect. When motion is detected in the space, the UCM shifts to its occupied setpoints and remains that way until 30 minutes (adjustable) after motion ceases. During the unoccupied mode, the VAV UCM controls to its unoccupied setpoints. The occupancy sensor has no effect on unoccupied operation.



## **Global Sensor Setpoint Limit Setup**

If the zone sensor setpoint thumbwheel is attached to a zone UCM is enabled, the thumbwheel setting becomes the active occupied setpoint. The setpoint at the thumbwheel is the active occupied cooling setpoint. The active occupied heating setpoint defaults 3°F below the cooling setpoint. Each zone UCM has a set of setpoint limits that restrict the setpoint range of the sensor thumbwheel. These limits default at the extremes, allowing the sensor setpoint to be set anywhere from 55°F to 95°F. Reduce this range to 6°F or less during system commissioning.

The VariTrac CCP allows you to create a single set of limits for the setpoint thumbwheels on the zone sensors and broadcast them to all the zones on the system at one time by pushing a single button. The global limit function can be accessed from the CCP operator display or the VariTrac PC software.

## **System Balance Mode**

A delivered VAV system can be placed in the balance mode from the operator display or the PC software using a single button selection. In this mode, the CCP automatically prepares the system for balancing by starting the supply fan, disabling heating and cooling, and opening all VAV boxes to their maximum position. To compensate for airside diversity, the VAV boxes can be overridden to close individually or in groups until the required total flow is achieved.

## Chapter 8

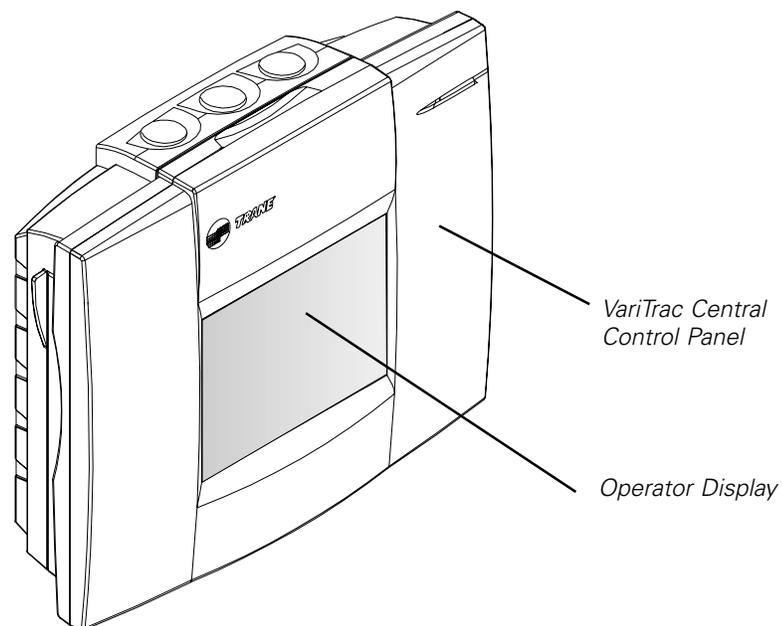
# Using the Operator Display

---

## Overview

The VariTrac system user interface consists of an operator display on the central control panel and a menu-driven interface program in the embedded software. The operator display is a liquid crystal display (LCD) touch screen.

**Figure 1.** VariTrac Central Control Panel with Operator Display



The user interface enables you to set parameters and access control and system status information. It uses five screens and a consistent screen layout. The five screen types are:

- Home
- Operation
- Data display
- Data entry
- Confirmation

## Screen Layout

With the exception of the home screen, each user interface screen conforms to a standard layout (see Figure 2). Each screen contains:

- Title bar
- Selection buttons
- Data or data entry buttons
- Navigation buttons

### Title Bar

A title bar is displayed at the top of each screen. The title bar states the purpose of the screen and/or describes the information displayed on the screen.

### Navigation Buttons

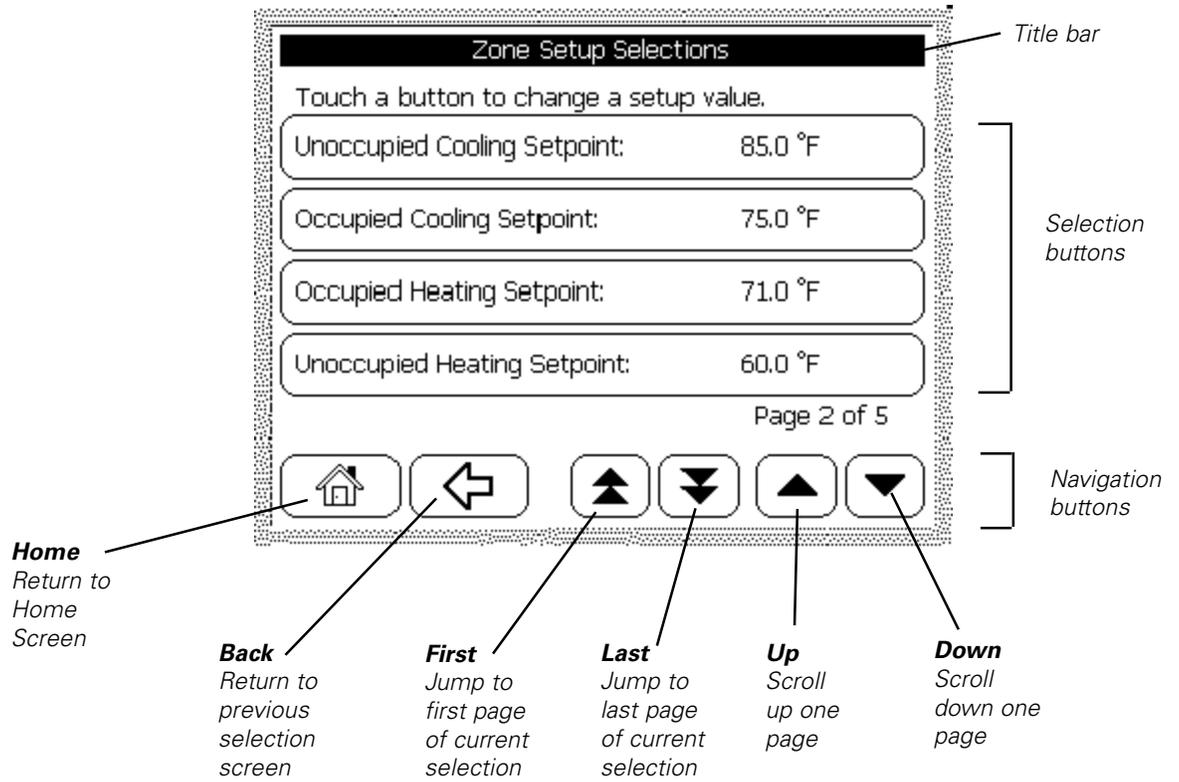
A screen can display up to six navigation buttons at the bottom of each page. The navigation buttons enable you to return to the home screen or to a previously viewed screen. They also enable you to go directly to the first or last page of the current screen and to scroll through the pages of the current screen.

### Selection Buttons

A screen may display selection buttons between the title bar and the navigation buttons. The selection buttons:

- enable you to further define a request to view or change data.
- display current settings or data, and enable you to select a specific item, view, or change.

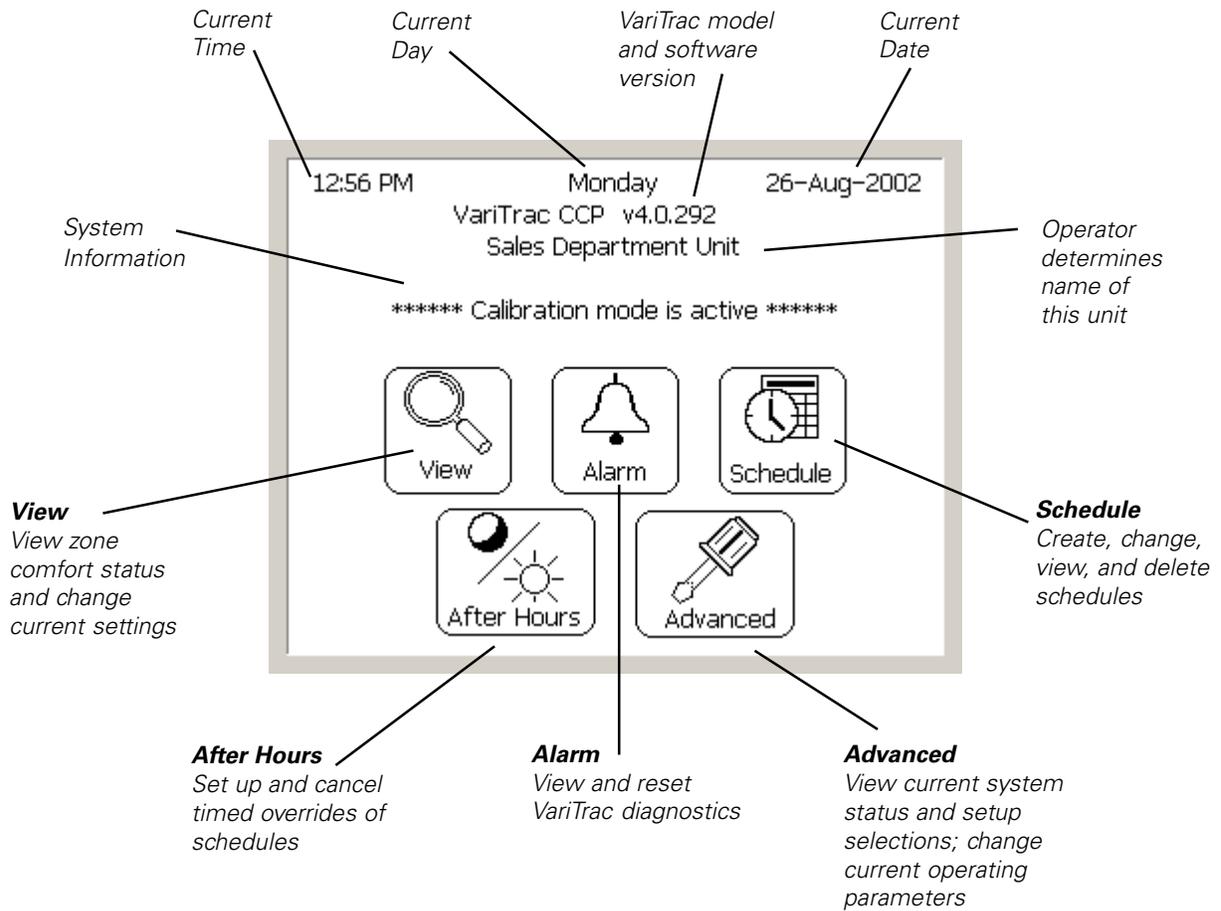
**Figure 2.** Example of Title Bar, Selection, and Navigation Buttons



## Home Screen

All VariTrac operating procedures begin at the Home screen. Function buttons enable you to select the View, Alarm, Schedule, After Hours, and Advanced functions. To select a function, press the corresponding button.

**Figure 3.** Example of Home Screen Layout



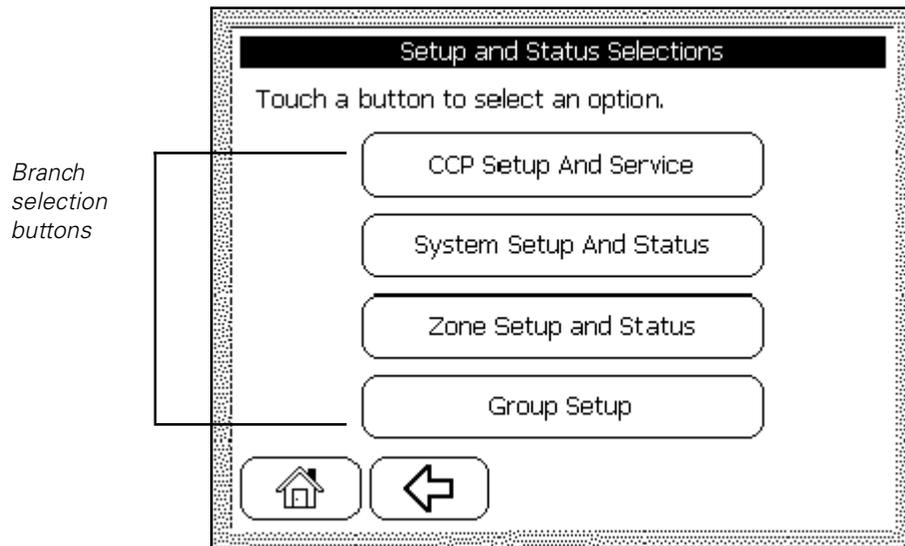
## Operation Screens

Operation screens enable you to define a request to view or change data. Operation screens include branch selection screens and editor screens.

### Branch Selection Screen

Branch selection screens enable you to select a branch category for creating, changing, viewing, or deleting function data. Branch selection screens do not display data and do not require that data be entered. To select a branch, press the corresponding button.

**Figure 4.** Example of Branch Selection Screen

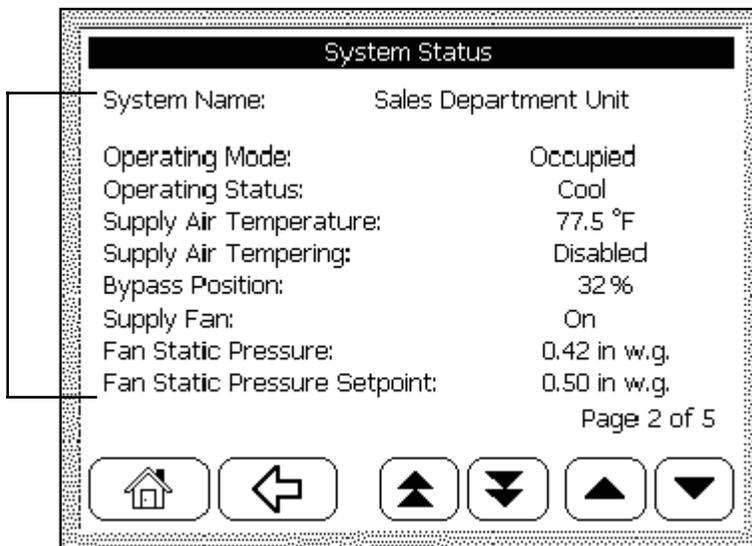


## Data Display Screens

Data display screens enable you to view the results of a data request.

**Figure 5.** Example of Data Display Screen

*Typical data screen showing current active system data*



## Data Entry Screens

Data entry screens enable you to enter numeric values and alpha characters. There are four types of data entry screens:

- Analog data entry
- Time entry
- Date entry
- Alphanumeric data

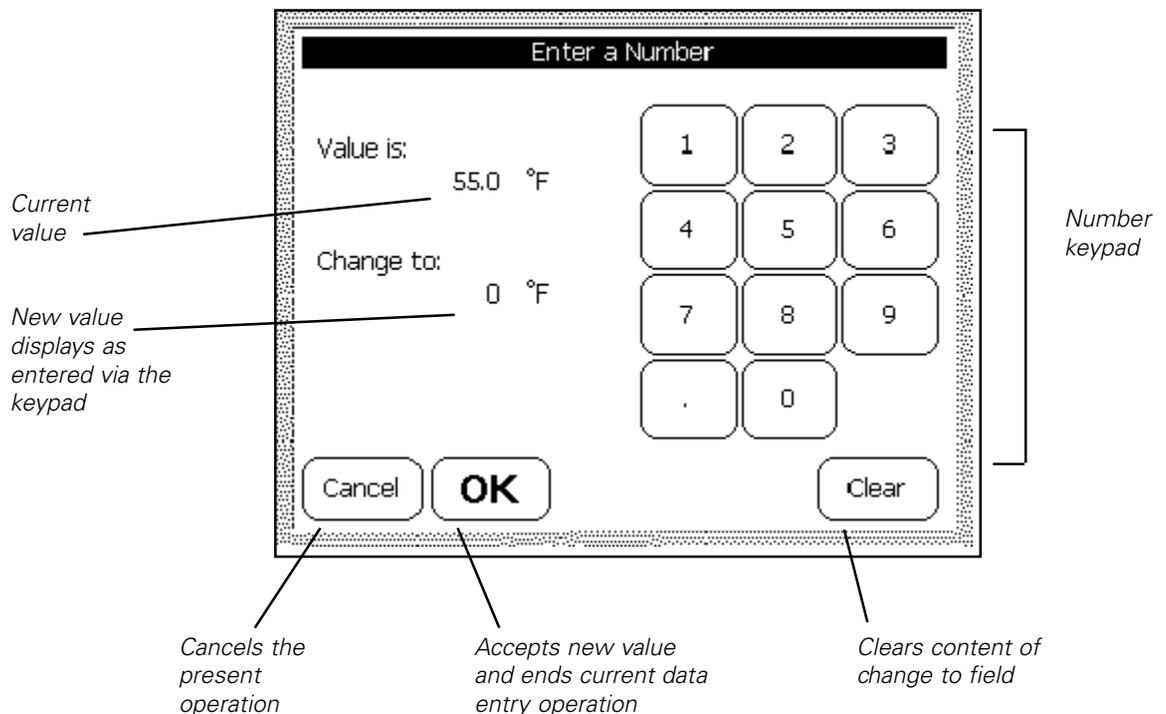
## Analog Data Entry Screen

The analog data entry screen enables you to change analog data. Between the title bar and navigation buttons are numeric data entry buttons. The OK and Clear buttons display at the bottom of the screen. A decimal point button enables you to type tenths.

To select a digit, the decimal point, and the minus sign, press the appropriate data entry buttons. Type the data using the format NN.N. As you type the data, it displays in the "Change to" field. Use the Clear button to delete the contents of the change field when necessary. When you have finished typing in the data, press the OK button.

The date entry screen and time entry screen are similar to the analog data entry screen, enabling you to enter current date and time. The time screen includes buttons for AM and PM. The date screen adds buttons for month selection.

**Figure 6.** Example of Analog Data Entry Screen.



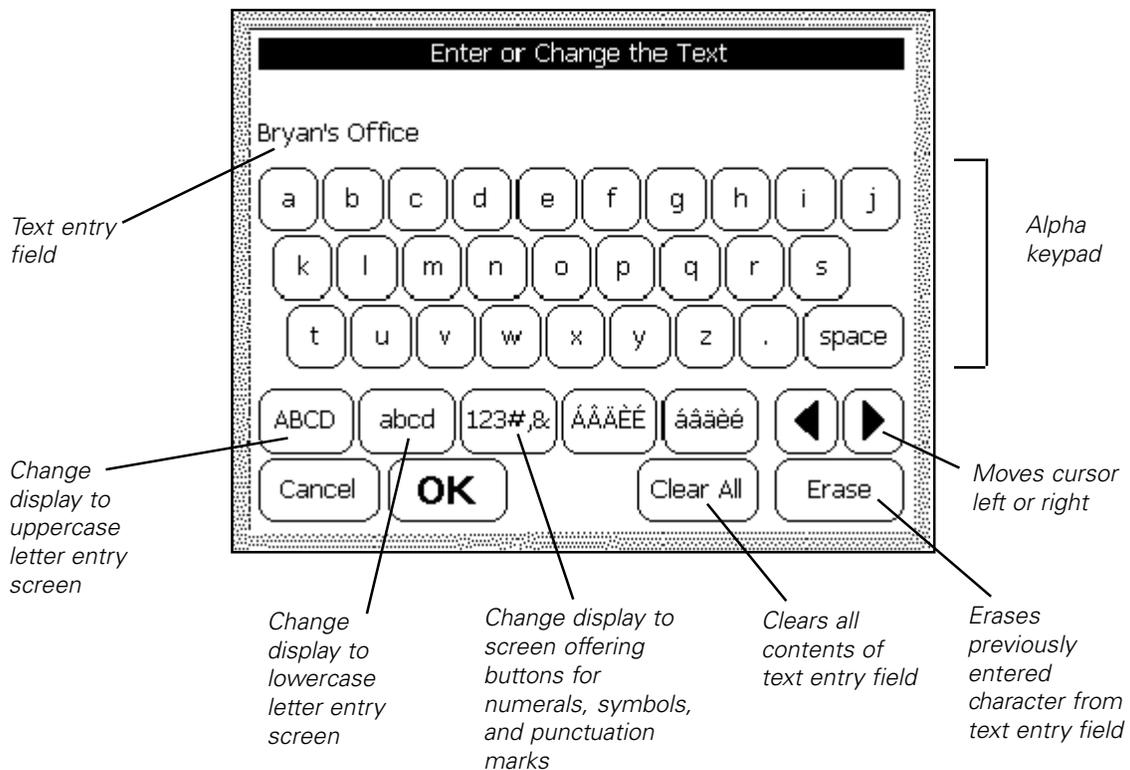
## Alphanumeric Data Entry Screen

The five data entry screens enable you to change alphanumeric parameters, such as names of rooms, equipment, etc. The five screens are:

- Numeric
- Uppercase letter
- Lowercase letter
- Uppercase diacritical mark (used in some non-English languages)
- Lowercase diacritical mark (used in some non-English languages)

To select digits, symbols, and letters, press the appropriate buttons. When your entry is complete, press the OK button.

**Figure 7.** Example of Alphanumeric Data Entry Screen



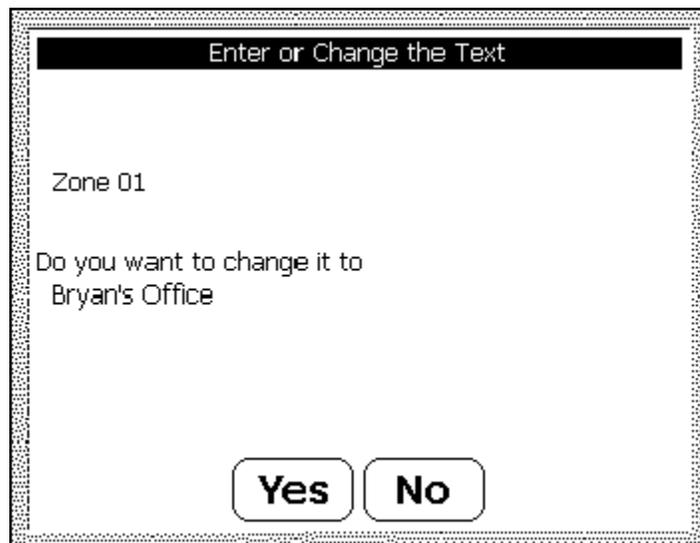
## Confirmation Screens

Confirmation screens require you to approve the execution of the requested change.

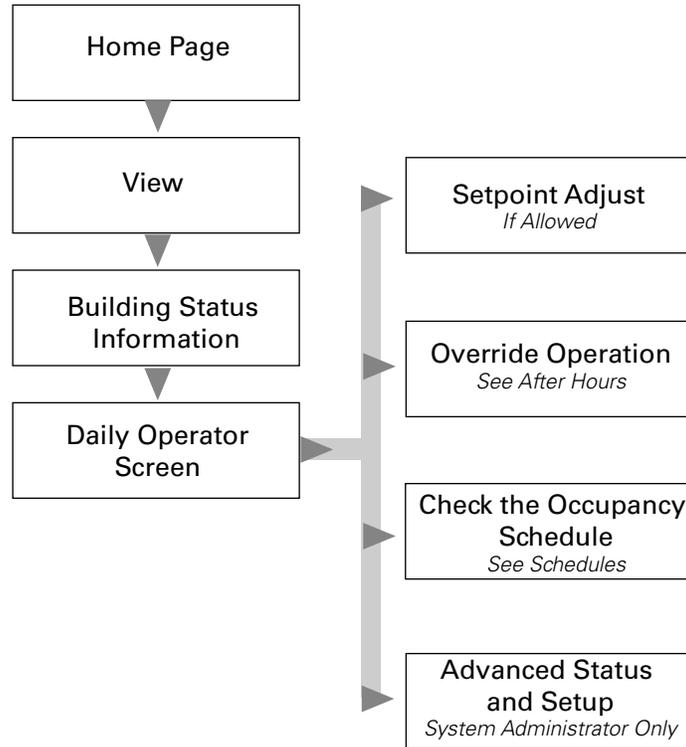
The first screen component contains one or more fields that identify your selected change. The next screen component provides warning messages that caution you about the selected operation.

Press **Yes** to execute the operation previously set up. Press **No** button to cancel the operation.

**Figure 8.** Example of Confirmation Screen



**Figure 9.** View Screen Sequence



## View Procedures

The **View** function allows access to setpoints, override functions, occupancy schedules, status and setup of a specific VariTrac system zone. All view functions begin at the VariTrac Home screen.

Additional in-depth information can be found in the Advanced section of this manual.

### Determine Area Temperature

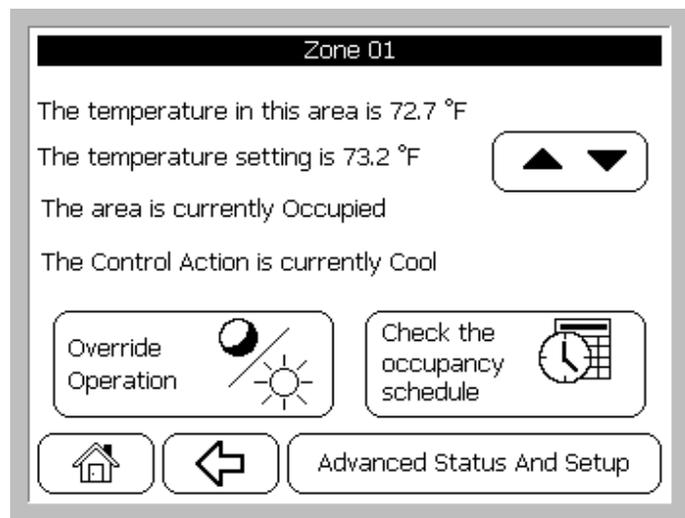
- 1 Press **View** to display building status information.

*Note:* Use the Up or Down arrow to locate the desired area.

### Determine Area Temperature Setting

- 1 Press **View** to display building status information.
- 2 Press the appropriate area button to display the daily operator screen for that area.

**Figure 10.** Example of Area Daily Operator Screen



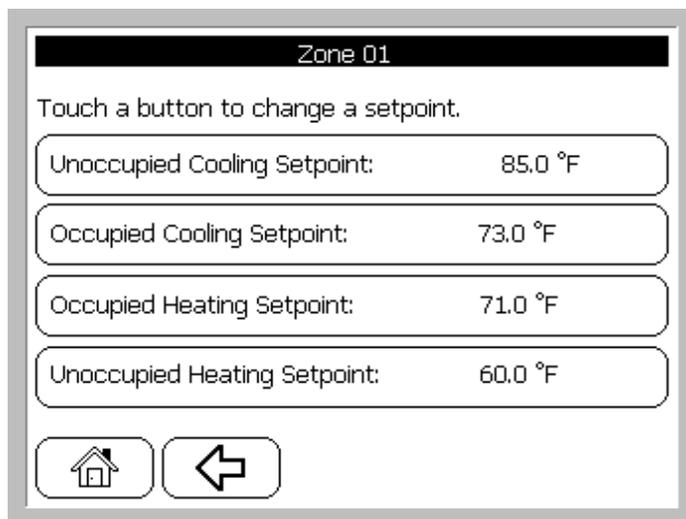
## Adjust Area Temperature Setting

- 1 Press **View** to display building information.
- 2 Press the appropriate area button to display the daily operator screen for that area. (See Figure 11.)
- 3 Press the **Up** or **Down** arrow to display setpoints for the selected area. (See Figure 12.)
- 4 Press the desired setpoint to display the standard analog adjustment screen.

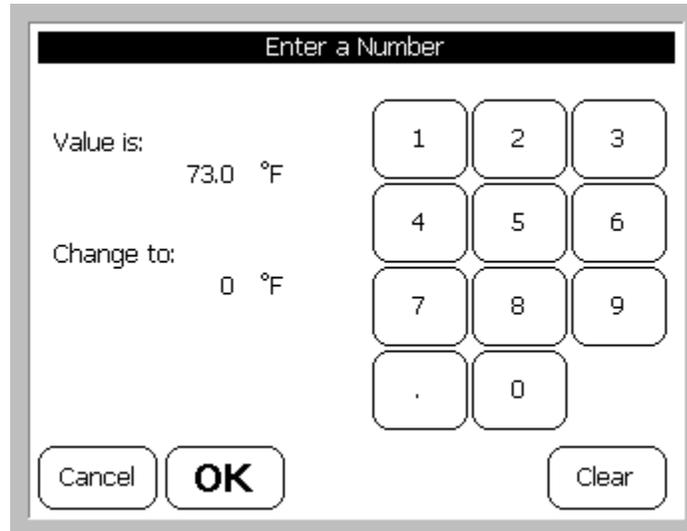
**Note:** If the temperature setpoint is under thumbwheel control, the system will display a setpoint adjustment error.

- 5 Enter the desired setpoint and press **OK**. The Enter a Number confirmation screen displays.

**Figure 11.** Example of Selected Area Setpoint Screen



**Figure 12.** Example of Analog Adjustment Screen



- 6** Press **Yes** to confirm the changes. The Setpoints screen for the area displays. The new setpoint displays in the appropriate button.
- 7** Continue editing setpoints, or press **Back** to return to the daily operator screen.

### **Determine Area Occupancy**

- 1** Press **View** to display building information.
- 2** Press the appropriate area button to display the daily operator screen for that area.

### **Acquire Detailed Area Occupancy Schedule Status**

- 1** Press **View** to display building information.
- 2** Press the appropriate area button to display the daily operator screen for that area.
- 3** Press **Check the Occupancy Schedule**. The Start and Stop Time Editor screen displays.

## Override Area Occupancy

- 1 Press **View** to display building information.
- 2 Press the appropriate area button to display the daily operator screen for that area.
- 3 Press **Override Operation**. The Override Selections (Single Area) screen displays.

**Note:** *If building occupancy is under higher level control (e.g., Tracker), the system responds with timed override prevented.*

- 4 Press **Start or Restart Timed Override**. The Confirm Single Area Timed Override screen displays
- 5 Press **OK** to return to the daily operator screen.

## Cancel Area Override

- 1 Press **View** to display building information.
- 2 Press the appropriate area button to display the daily operator screen for that area.
- 3 Press **Override Operation**. The Override Selections (Single Area) screen displays

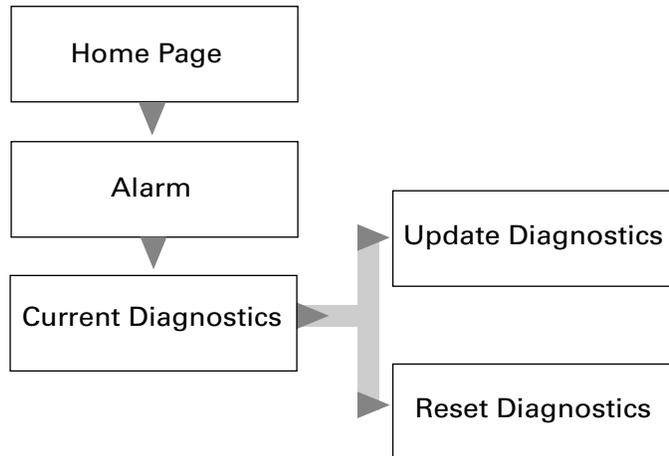
**Note:** *If building occupancy is under higher level control (e.g., Tracker), the system prevents timed override.*

- 4 Press **Cancel Timed Override**. The Confirm Cancel Single Area Timed Override screen displays.
- 5 Press **OK** to return to the daily operator screen.

## Acquire Detailed Area Status and Setup

- 1 Press **View** to display building information.
- 2 Press the appropriate area button to display the daily operator screen for that area.
- 3 Press **Advanced Status and Setup**. The Zone Setup and Status screen displays.
- 4 Press the desired action to display building information.
- 5 Press the appropriate area button to display the appropriate setup or status screen for that area.

**Figure 13.** Alarm Screen Sequence



## Alarm Procedures

The Alarm function allows you to view, update, and reset VariTrac diagnostics. All diagnostic functions begin at the home screen. Only active diagnostics are displayed in the list. The VariTrac panel does not maintain a history of diagnostics or alarms.

### View VariTrac Diagnostics

- 1** Press **Alarm**. The Current Diagnostics screen displays.
- 2** Press **Update Diagnostics** to refresh the screen. The Current Diagnostics screen updates.
- 3** Press **Reset Diagnostics**. The Current Diagnostics screen displays. Latching diagnostics are reset (such as Voyager or Reliabel compressor lockouts).

VariTrac diagnostics are divided into three categories:

#### **Priority 1** (Table 2, p. 57)

Low-priority diagnostics which do not have a major effect on operation and typically do not require immediate attention.

#### **Priority 2** (Table 3, p. 58)

Medium-priority diagnostics which can affect system operation and usually require service.

#### **Priority 3** (Table 4, p. 59)

High-priority diagnostics which place the system in priority shutdown. Priority shutdown stops heating, cooling, and system-fan operation. Service is required.



**Table 2.** VariTrac Priority 1 Diagnostics

1 Comp1 Disable Input/LPC Open 1 Comp2 Disable Input/LPC Open	Indicates the Voyager/ReliaTel low pressure cutout control has opened due to adversely low refrigerant pressure. (See wiring diagram in service literature for individual units.)
1 Dirty Filter	Indicates the Voyager/ReliaTel unit's air filters are dirty and need to be replaced. This input is provided by an optional air pressure differential switch across the filters.
1 Defrost control Input	The defrost control input in the Voyager has failed, indicating a problem with the defrost module or defrost temperature sensor.
1 Local Econ Min Pos Fail	The minimum position potentiometer on the Voyager economizer board has failed.
1 Outdoor Temp Sensor Fail 1 OA Rel Humid Fail 1 RA Temp Sensor Fail 1 RA Rel Humid Fail	Indicates the Voyager/ReliaTel is not receiving a valid value from the sensor. Likely causes are faulty sensor connections, faulty wiring, or sensor failure.
1 SA Temp Sensor Fail <b>Note:</b> See 3 SA Temp Sensor Fail in the Priority 3 Diagnostics table	Indicates the Voyager is not receiving a valid value from the supply air temp sensor. Likely causes are poor wiring connection, faulty sensor wiring, or sensor failure.
1 Zone Temp Sensor Fail 1 HW Zone Cooling Setpoint 1 HW Zone Heating Setpoint	Indicates the Voyager/ReliaTel is not receiving valid input from the zone temperature sensor. These diagnostics will not typically be seen on the CCP, because a zone sensor is not generally applied to the RTU when it is connected to a CCP. If they appear, the likely cause is a loose wiring connection in the RTU; or a zone sensor has been applied on the unit and there is faulty wiring between the sensor and the RTU; or the sensor is defective.
1 VAV <u>xx</u> Global Zone Sens Fail	The zone temp sensor for VAV zone <u>xx</u> has failed.
1 VAV <u>xx</u> Hdwire Zone Sens Fail	The zone temp sensor wired to VAV zone <u>xx</u> has failed. Likely causes are faulty sensor connections, faulty wiring, or sensor failure.
1 VAV <u>xx</u> Global Stat Sens Fail	The zone sensor local setpoint for VAV zone <u>xx</u> has failed.
1 VAV <u>xx</u> Setpoint Fail	The zone sensor setpoint wired to VAV zone <u>xx</u> has failed. Likely causes are Use Local Setpoint has been enabled where no local setpoint exists, faulty sensor connections, faulty wiring, or sensor failure.
1 VAV <u>xx</u> Aux Sens Fail	The auxiliary sensor wired to VAV zone <u>xx</u> has failed. Likely causes are faulty sensor connections, faulty wiring, or sensor failure.
1 VAV <u>xx</u> CO <sub>2</sub> Sens Fail	The CO <sub>2</sub> sensor wired to VAV zone <u>xx</u> has failed. Likely causes are aux sensor set to CO <sub>2</sub> and no sensor is installed, no power to sensor, faulty sensor connections, faulty wiring, or sensor failure.
1 VAV <u>xx</u> Flow Sens Fail	The flow transducer wired to VAV zone <u>xx</u> has failed. Likely causes are faulty sensor connections or a transducer failure.



Using the Operator Display

**Table 3.** VariTrac Priority 2 Diagnostics

2 All VAV UCMs Tagged	The tagging process is enabled and all the VAV UCMs have been tagged. The unit will disable all stages of heat and cool and will continue to run the supply fan.
2 Bypass Calibration Fail	Indicates the CCP failed to complete the calibration process. Likely causes are failure to read zero flow (fan did not shut off or bad static pressure transducer), or failure to read a valid static pressure value with the fan on (system not balanced properly, oversized ductwork, or bad or improperly installed static pressure transducer).
2 Bypass Duct Press Sens Fail	The pressure transducer on the communicating sensor assembly is indicating a failure because it did not read zero flow during calibration. This can result from continuous supply flow during calibration (fan not shutting off), or a bad static pressure transducer.
2 Compressor 1 HPC 2 Compressor 2 HPC	Indicates the Voyager/ReliaTel compressor contactor control circuit has opened. Depending on unit type, the condition may result from: <ul style="list-style-type: none"> <li>- Compressor contactor coil failure</li> <li>- Exceeding high pressure control limit</li> <li>- Exceeding discharge temperature limit</li> <li>- Exceeding winding temperature limit</li> <li>- Compressor Circuit breaker open</li> </ul>
2 Compressor 1 Lockout 2 Compressor 2 Lockout	Indicates the Voyager/ReliaTel compressor contactor control circuit has opened (a high pressure control, if installed, or possibly a burned out compressor contactor coil), or the Voyager/ReliaTel low-pressure control has opened during the three minute minimum ON time on four consecutive compressor starts. This is a latching alarm that requires a manual reset. The compressor lockouts can be manually reset by pressing the Reset Diagnostics button on the current diagnostic screen..
2 Heat Fail	Indicates the Voyager has tripped the high temperature limit switch (TCO2). This alarm occurs on gas heat units only.
2 High Pressure Limit Trip	Diagnostic applies to Voyager Commercial VAV units only. The high static pressure limit switch mounted in the Voyager unit has tripped.
2 HVAC Unit Comm Fail	Indicates that communication between the VariTrac CCP and the Voyager/ReliaTel unit has failed. Likely causes are faulty communication link wire (twisted pair), or power loss to the Voyager/ReliaTel controls.
2 Pressure Sensor Fail	Diagnostic applies to Voyager Commercial VAV units only. The unit is not receiving valid input from the static pressure sensor mounted in the Voyager unit. This failure forces the unit to go into shutdown.
2 MWU Setpoint Fail 2 SA Reset Amount Fail 2 SA Cooling Setpoint Fail 2 SA Reset Setpoint Fail 2 SA Pressure Setpoint Fail 2 SA Pressure Deadband Fail	Diagnostic applies to Voyager Commercial VAV units only. The Voyager unit is not receiving a valid input from the indicated manual setpoint potentiometer mounted in the Voyager unit. This setpoint panel is typically used for stand-alone unit operation and is overridden by the setpoints communicated from the CCP.
2 Supply Fan Fail	Indicates the supply fan is not providing adequate airflow. This input is provided by an optional air pressure differential switch across the supply fan inlet and discharge.
2 VAV <u>xx</u> Comm4 Fail	The CCP cannot communicate with the VAV UCM at address <u>xx</u> . The CCP has communicated with a UCM at this address in the past, but cannot do so now. Likely causes are the UCM is not on the Comm4 link, the UCM is not powered, there are duplicate UCMs addresses at <u>xx</u> , the Comm4 link is down, or the UCM board has failed.
2 VAV <u>xx</u> Must be in a Group	The zone has lost its group assignment. All zones must be assigned to a group for CCP to function properly. Assign the zone to a group and then reset the diagnostic.

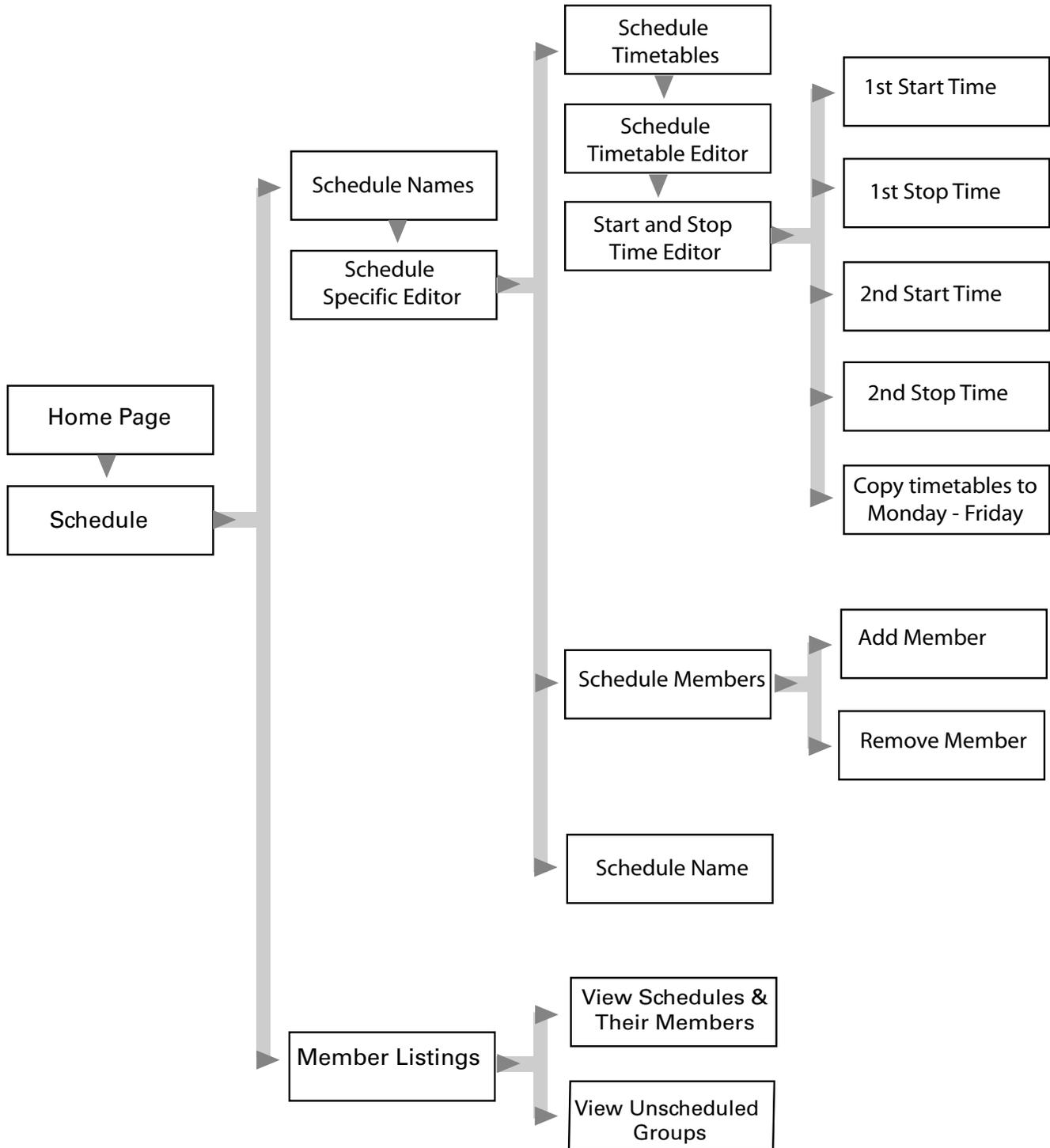


**Table 4.** VariTrac Priority 3 Diagnostics

**Note:** Priority 3 diagnostics will place the system in priority shutdown. Priority shutdown causes the heating, cooling, and system fan to shut down. Service is required.

3 Bypass Comm Fail	The CCP cannot communicate with the communicating sensor assembly. Likely causes are the sensor assembly has not been properly installed (not on the Comm4 link, not powered, or is not addressed at 33), Comm4 link is down, or the UCM board in the sensor assembly has failed.
3 Bypass Configuration Fail	The CCP cannot configure the UCM in the communicating sensor assembly as a bypass controller. Likely cause is the UCM board at address 33 is not UCM Version 4 or later.
3 Bypass Duct Temp Sens Fail	The discharge-air-temperature sensor on the communicating sensor assembly has failed.
3 CCP Priority Shutdown Input	The priority shutdown input on the CCP terminal strip (TB2-6 to TB2-7) is closed.
3 Complete VAV UCM Comm Fail	There are no VAV UCMs communicating to the CCP on the Comm4 link.
3 High Temperature Input	Indicates the high-temperature input connected to the Trane Communications Interface (TCI) has opened. This causes the Voyager unit to go into priority shutdown.
3 ICS Initiated Shutdown	A global Priority Shutdown command has been received from the Tracker panel.
3 No Voting VAV UCMS	There are no voting VAV UCMs on the link. Likely cause is the comm link is down or all communicating VAV UCMs have been edited to "no vote."
3 No OD w/Delivered VAV	The CCP has auto-configured as a Delivered VAV system (communicating with a Voyager Commercial 27½ to 50-ton VAV RTU) and there is no operator display on the CCP. An operator display on the CCP is required for delivered VAV.
3 SA Temp Sensor Fail	Diagnostic applies to Voyager Commercial VAV units only. The Voyager unit is not receiving a valid input from the supply air temperature sensor mounted in the Voyager unit. This failure will force the CCP into priority shutdown.

**Figure 14.** Schedule Screen Sequence



## Schedule Procedures

The Schedule function allows you to name, change, and view VariTrac schedules. All schedule functions begin at the VariTrac Home screen. The schedule procedure consists of naming a schedule, creating a timetable, and then adding areas to the schedule as members.

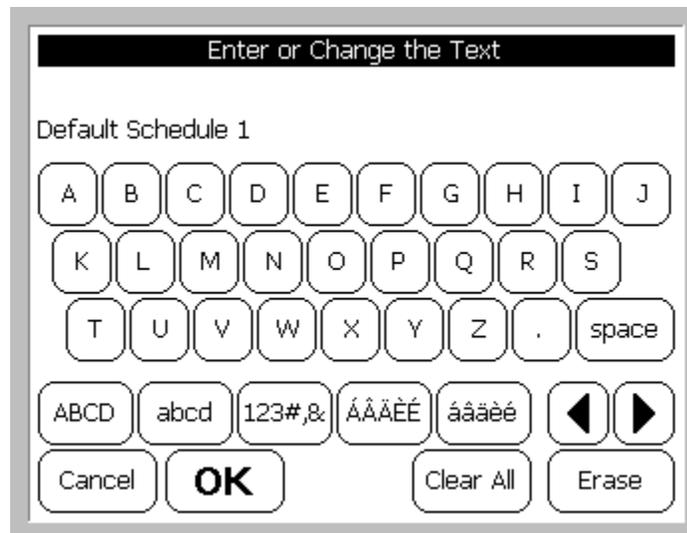
If the VariTrac system is under schedule control of an upper-level system (e.g., Tracker Version 10), it responds with the Upper Level System Control screen. Press **Return** to exit the VariTrac schedule procedure or **Continue** to proceed.

If the VariTrac has lost communication with the upper-level system, it responds with the Upper Level System Control: Comm Down screen. Press **Press to Continue and Return System to Standalone Status (hide this screen)** to permanently remove this screen (e.g., the upper-level system is removed). Press **Return** to exit the VariTrac schedule procedure or **Continue** to proceed.

### Change Daily Schedule Name

- 1** Press **Schedule**.
- 2** Press the button for the schedule that you want to change. The Schedule Specific Editor screen displays. The name of the selected schedule appears in the Schedule Name field.
- 3** Press **Schedule Name**. The Enter or Change the Text screen displays.

**Figure 15.** Example of Enter or Change the Text Screen

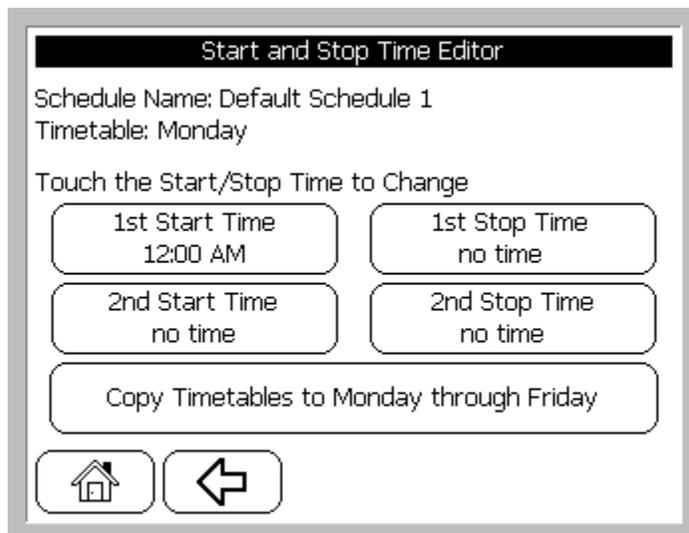


- 4 Enter the desired schedule name and press **OK**. The Enter or Change the Text confirmation screen displays.
- 5 Press **Yes** to confirm the changes. The Schedule Specific Editor screen displays. The new name of the schedule appears in the Schedule Name field.
- 6 Press **Home** to exit this procedure.

## Change Daily Schedule Start and Stop Times

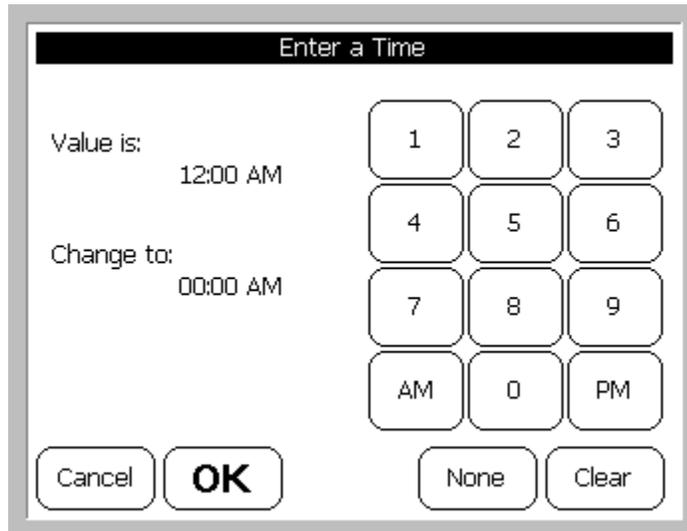
- 1 Press **Schedule**.
- 2 Press the button for the schedule you want to change. The Schedule Specific Editor screen displays. The name of the selected schedule is in the Schedule Name field.
- 3 Press **Schedule Timetables**. The Schedule Timetable Editor screen displays.
- 4 Press the button for the day you want to change. The Start and Stop Time Editor screen displays. (See Figure 16.)
- 5 Press the button for the start time or stop time you want to change. The Enter a Time screen displays. (See Figure 17.)

**Figure 16.** Example of Start and Stop Time Editor Screen



- 6** Enter the desired time. Press **OK**.
- 7** Press **Yes** to confirm the change. The Start and Stop Time Editor screen displays the entered time.
- 8** Repeat Steps 5–7 to change additional start and stop times for the current day.
- 9** To change the schedule for another day, press **Back**. The Schedule Timetable Editor screen displays. Repeat Steps 4–7 above to change additional schedules.
- 10** To apply the schedule to Monday through Friday, press **Press to Copy Timetables to Monday through Friday**. The Confirmation for Copying a Timetable screen displays.
- 11** Press **Yes** to confirm the action. The Start and Stop Time Editor screen displays.
- 12** Press **Home** to exit this procedure.

**Figure 17.** Example of Enter a Time Screen

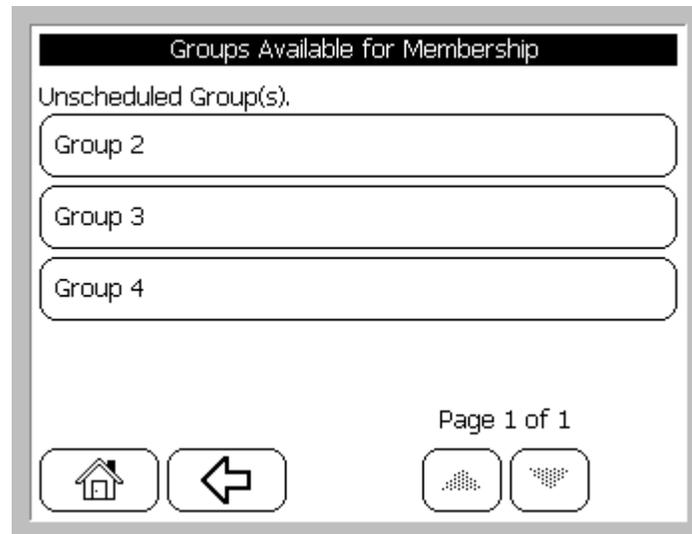


The screenshot shows a screen titled "Enter a Time". On the left side, it displays "Value is: 12:00 AM" and "Change to: 00:00 AM". To the right of this text is a numeric keypad with buttons for digits 1 through 9, 0, AM, and PM. At the bottom of the screen, there are four buttons: "Cancel", "OK", "None", and "Clear".

## Add Member to Daily Schedule

- 1 Press **Schedule**.
- 2 Press the button for the schedule you want to change. The Schedule Specific Editor screen displays. The name of the selected schedule is in the Schedule Name field.
- 3 Press **Schedule Members**. The Schedule Members Editor screen displays.
- 4 Press **Add Member**. The Groups Available for Membership screen displays. (See Figure 18.)
- 5 Press the button for the group you want to add. The Confirmation for Adding a Member screen displays.
- 6 Press **Yes** to confirm the change. The Groups Available for Membership screen displays.
- 7 Repeat Steps 5–6 to add additional members to the schedule.
- 8 Press **Home** to exit this procedure.

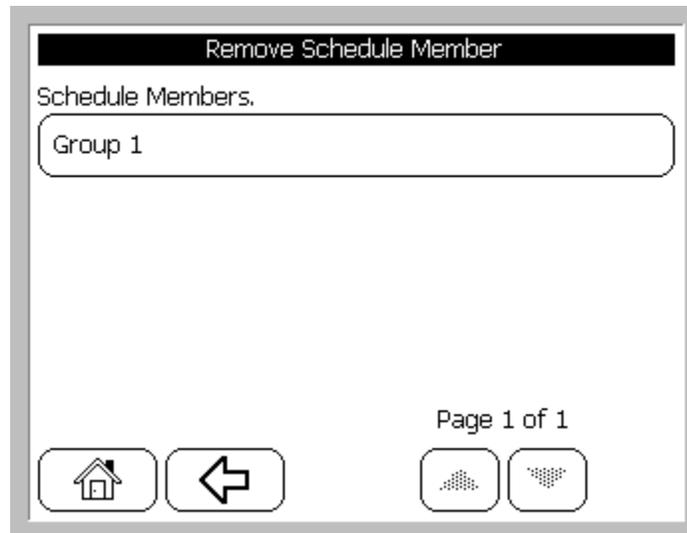
**Figure 18.** Example of Groups Available for Membership Screen



## Remove Member from Daily Schedule

- 1 Press **Schedule**.
- 2 Press the button for the schedule that you want to change. The Schedule Specific Editor screen displays with the name of the selected schedule in the Schedule Name field.
- 3 Press **Schedule Members** and the Schedule Members Editor screen displays.
- 4 Press **Remove Member** and the Remove Schedule Member screen displays. (See Figure 19.)
- 5 Press the button for the group you want to remove. The Confirmation for Removing a Member screen displays.
- 6 Press **Yes** to confirm the change. The Remove Schedule Member screen displays.
- 7 Repeat Steps 5–6 to remove additional members from the schedule.
- 8 Press **Home** to exit this procedure.

**Figure 19.** Example of Remove Schedule Member Screen



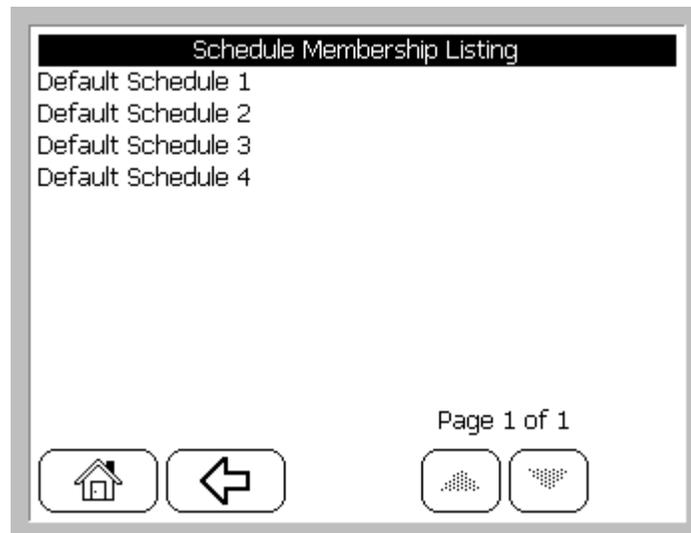
## View List of Daily Schedules and Check Occupancy

- 1 Press **Schedule**. The Schedules screen displays the list of schedules and the current occupancy state.
- 2 Press **Home** to exit this procedure.

## View a Daily Schedule and Schedule Members

- 1 Press **Schedule**.
- 2 Press **Member Listings**. The Member and Group Listings screen displays.
- 3 Press **View Schedules and Their Members**. The Schedule Membership Listing screen displays. (See Figure 20.)
- 4 Press **Home** to exit this procedure.

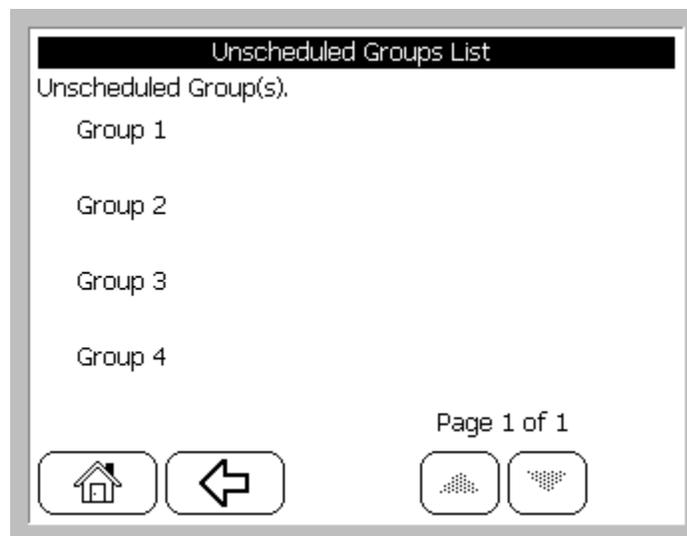
**Figure 20.** Example of Schedule Membership Listing Screen



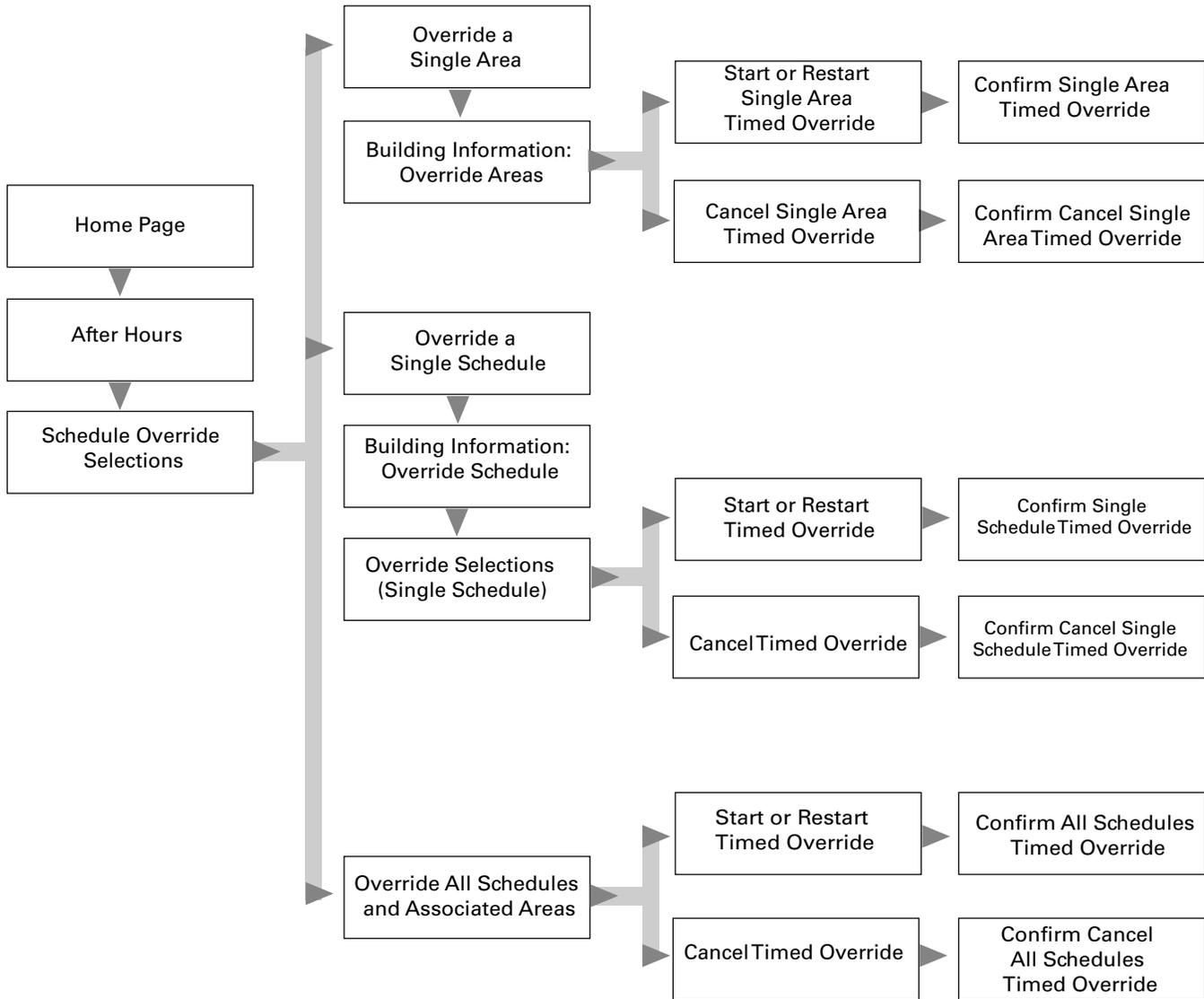
## View Unscheduled Members

- 1 Press **Schedule**.
- 2 Press **Member Listings**. The Member and Group Listings screen displays.
- 3 Press **View Unscheduled Groups**. The Unscheduled Groups List screen displays.
- 4 Press **Home** to exit this procedure.

**Figure 21.** Example of Enter or Change the Text Screen



**Figure 22.** After Hours Screen Sequence



## After Hours Procedures

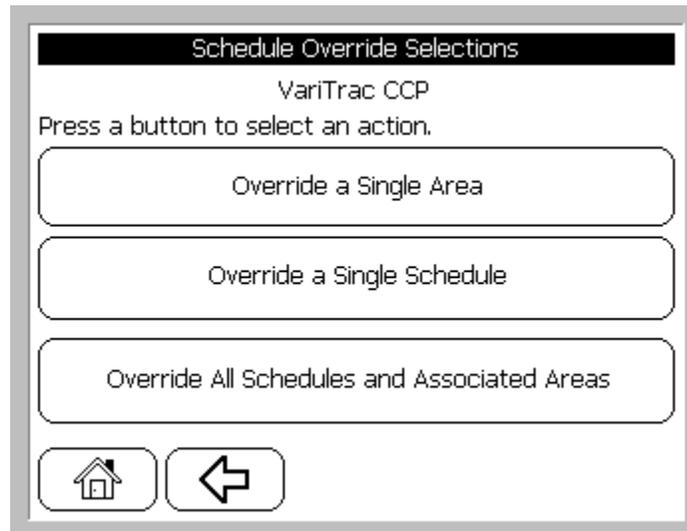
The After Hours function allows you to initiate and cancel occupancy status overrides of areas and schedules. All After Hours functions begin at the home screen.

**Note:** If building occupancy is under higher-level control (e.g., Tracker), the system responds with timed override prevented.

### Start or Restart an Area Timed Override

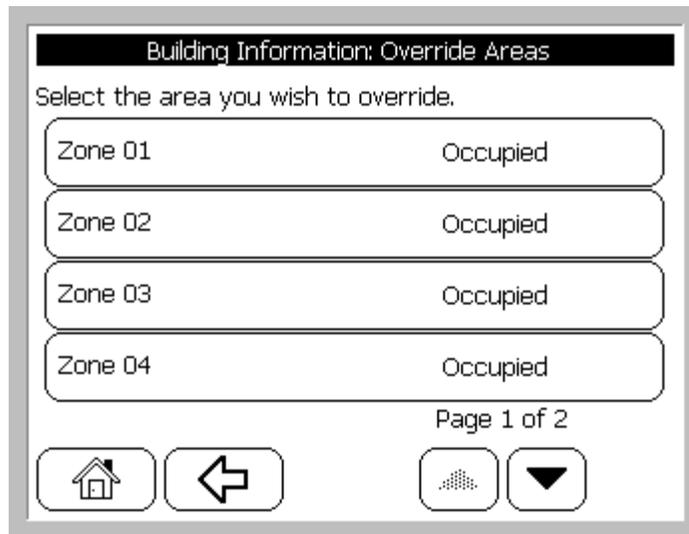
- 1 Press **After Hours**. The Schedule Override Selections screen displays.

**Figure 23.** Example of Schedule Override Selections Screen



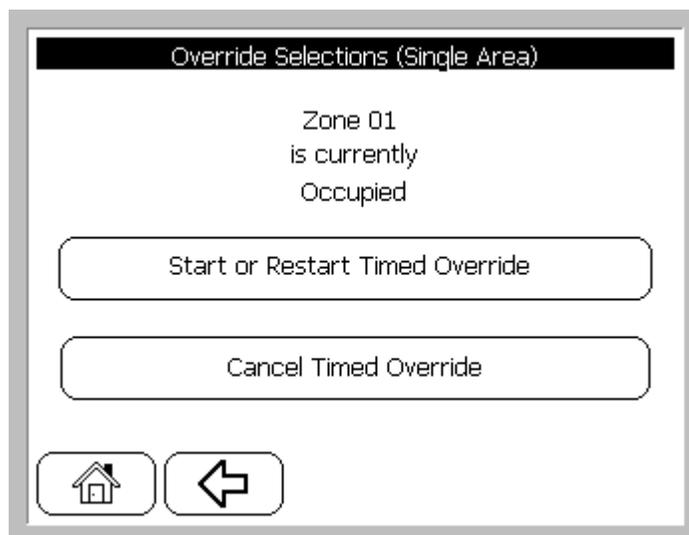
- Press **Override a Single Area**. The Building Information: Override Areas screen displays.

**Figure 24.** Example of Building Information: Override Areas Screen



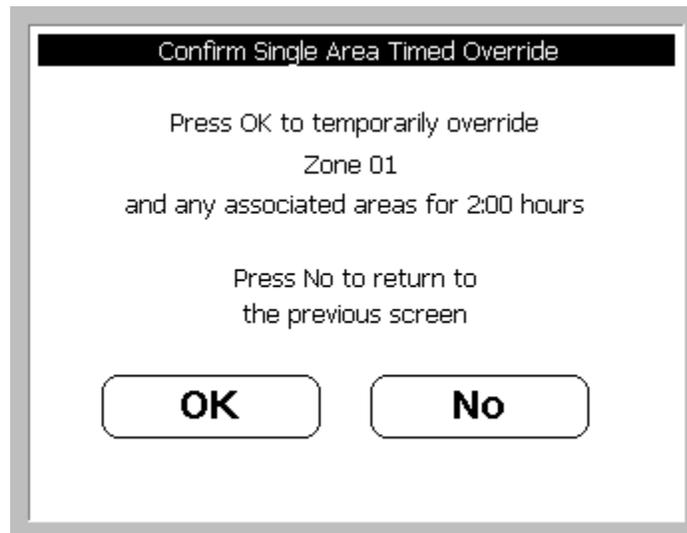
- Press the button for the area that you want to override. The Override Selections (Single Area) screen displays.

**Figure 25.** Example of Override Selections (Single Area)



- 4** Press **Start or Restart Timed Override**. The Confirm Single Area Timed Override screen displays. (See Figure 26.)
- 5** Press **OK**. The Building Information: Override Areas screen displays.
- 6** To override additional areas, repeat Steps 3–5.
- 7** Press **Home** to exit this procedure.

**Figure 26.** Example of Confirm Single Area Timed Override Screen



## **Start or Restart Timed Override of a Single Schedule**

- 1** Press **After Hours**. The Schedule Override Selections screen displays.
- 2** Press **Override a Single Schedule**. The Building Information: Override Areas screen displays.
- 3** Press the button for the schedule you want to override. The Override Selections (Single Schedule) screen displays.
- 4** Press **Start or Restart Timed Override**. The Confirm Single Schedule Timed Override screen displays.
- 5** Press **OK**. The Building Information: Override Areas screen displays.
- 6** To override additional schedules repeat Steps 3–5.
- 7** Press **Home** to exit this procedure.

## **Start or Restart All Timed Override Schedules**

- 1** Press **After Hours**. The Schedule Override Selections screen displays.
- 2** Press **Override All Schedules and Associated Areas**. The Override Selections (All Schedules) screen displays.
- 3** Press **Start or Restart Timed Override**. The Confirm All Schedules Timed Override screen displays.
- 4** Press **OK**. The Schedule Override Selections screen displays.
- 5** Press **Home** to exit this procedure.

## **Cancel a Single Area Timed Override**

- 1** Press **After Hours**. The Schedule Override Selections screen displays.
- 2** Press **Override a Single Area**. The Building Information: Override Areas screen displays.
- 3** Press the button for the area that you want to override. The Override Selections (Single Area) screen displays.
- 4** Press **Cancel Timed Override**. The Confirm Cancel Single Area Timed Override screen displays.
- 5** Press **OK**. The Building Information: Override Areas screen displays.
- 6** To cancel additional overrides, repeat Steps 3–5.
- 7** Press **Home** to exit this procedure.

## **Cancel Timed Override of a Single Schedule**

- 1** Press **After Hours**. The Schedule Override Selections screen displays.
- 2** Press **Override a Single Schedule**. The Building Information: Override Schedule screen displays.
- 3** Press the button for the schedule that you want to override. The Override Selections (Single Schedule) screen displays.
- 4** Press the **Cancel Timed Override** button. The Confirm Cancel Timed Override screen displays.
- 5** Press **OK**. The Building Information: Override Schedule screen displays.
- 6** To cancel additional overrides, repeat Steps 3–5.
- 7** Press **Home** to exit this procedure.

## **Cancel Timed Override of All Schedules**

- 1** Press **After Hours**. The Schedule Override Selections screen displays.
- 2** Press **Override All Schedules and Associated Areas**. The Override Selections (All Schedules) screen displays.
- 3** Press **Cancel Timed Override**. The Confirm Cancel Timed Overrides screen displays.
- 4** Press **OK**. The Schedule Override Selections screen displays.
- 5** Press **Home** to exit this procedure.



*Using the Operator Display*

## Chapter 9

# Advanced Functions

---

The **Advanced** function allows you to perform in-depth setup and/or monitor detailed status of four subfunctions. All Advanced functions begin at the home screen. The subfunctions are:

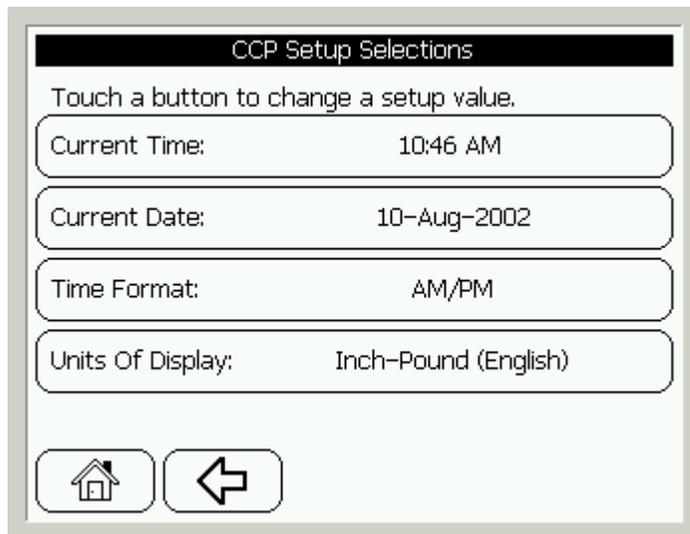
- **CCP Setup and Service.** Allows setup and service of the actual CCP panel, including time and date.
- **System Setup and Status.** Allows setup and status of the VariTrac system, including discharge air temperature and static air pressure setpoints.
- **Zone Setup and Status.** Allows setup and status of factors pertaining to the VariTrac zones, including zone heating and cooling setpoints.
- **Group Setup.** Allows setup of factors pertaining to the VariTrac groups, including ventilation mode and flow override.

## CCP Setup and Service

### CCP Setup

**CCP Setup** allows you to set the current time, set the current date, select the time format, and choose the units of display. To access CCP Setup from the home screen:

- 1** Press **Advanced**.
- 2** Press **CCP Setup and Service**.
- 3** Press **CCP Setup**. The CCP Setup Selections screen appears.

**Figure 27.** Example of CCP Setup Selections Screen**Set the Current Time**

- 1 Press **Current Time**. The Enter a Time screen displays.
- 2 Enter the time. Make sure to choose AM or PM. You will see the time change on the left side as you enter it.
- 3 Press **OK**.
- 4 Press **Yes** to verify your entry. The CCP Setup Selections screen appears.

**Set the Current Date**

- 1 Press **Current Date**. The Enter a Date screen displays.
- 2 Enter the correct date using DD-MMM-YYYY format. The date changes on the left side as you enter.

**Note:** After the day of the month is entered, the entry buttons change to month selections. After you enter the month, the screen again displays numerics where you enter the year.

- 3 Press **OK**.
- 4 Press **Yes** to verify your entry. The CCP Setup Selections screen appears.

### Set the Time Format

- 1 Press **Time Format**. The SetTime Format screen displays.
- 2 Press **AM/PM** or **24 Hour**.
- 3 Press **Yes** to verify your entry. The CCP Setup Selections screen appears.

### To Change the Units of Display

- 1 Press **Units of Display**. The Select Units of Measure screen displays.
- 2 Press **Inch-Pound (English)** or **International System (SI)**.
- 3 Press **Yes** to verify your entry. The CCP Setup Selections screen appears.

## Service and Testing

The CCP Service and Testing function allows you to adjust the setup parameters of the operator display screen. This includes adjusting the screen contrast and brightness, and calibrating the touch screen so the targets perform properly.

CCP Service and Testing also allows you to perform CCP hardware and software test and status functions. These functions include viewing the status of the CCPs inputs and outputs, viewing memory and processor status, rebooting the panel, and putting the CCP into test mode.

To access CCP Service and Testing from the home screen:

- 1 Press **Advanced**.
- 2 Press **CCP Setup and Service**.
- 3 Press **Service and Testing**. The Service and Test Selections screen displays.

**Figure 28.** Example of Service and Test Selections Screen



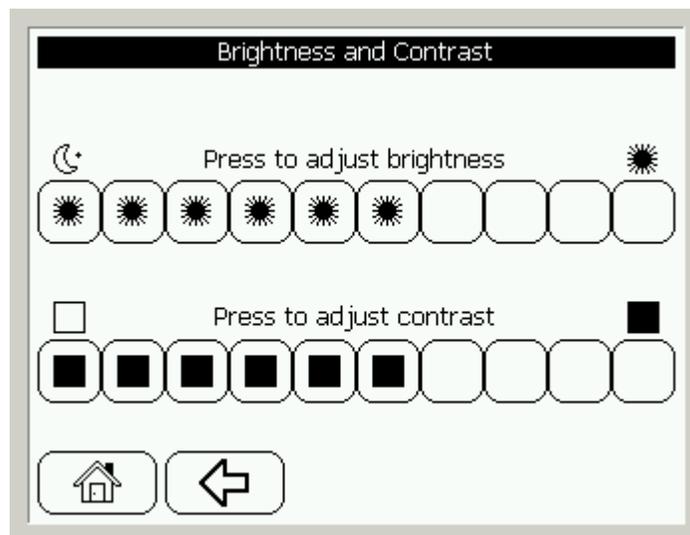
## Operator Display Parameters

### Adjust Contrast/Backlight

To adjust contrast and brightness of the operator display:

- 1 Press **Operator Display Parameters**.
- 2 Press **Adjust Contrast/Backlight**. The Brightness and Contrast screen displays. Two rows of buttons appear, one for **brightness** adjustment and one for **contrast** adjustment.
- 3 Press the buttons to the left to reduce contrast and brightness. Press the buttons to the right to increase contrast and brightness.
- 4 The screen reflects the change as you press the buttons.
- 5 Press **Back** arrow to exit this procedure. The Operator Display Parameters screen displays.

**Figure 29.** Example of Adjusting Brightness and Contrast Screen

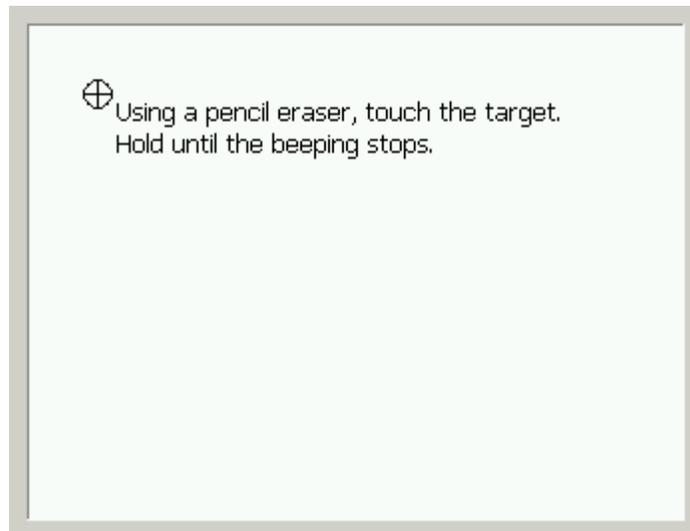


### **Calibrate Touch Screen**

To calibrate the accuracy of the touch screen buttons:

- 1** Press **Calibrate Touch Screen**.
- 2** The touch screen calibration function displays.
- 3** The screen instructs you to press the calibration target in the upper left hand corner of the screen. Press until the beeping stops (about 10 beeps).
- 4** The screen then instructs you to press the calibration target in the lower right hand corner of the screen. Press until the beeping stops (about 10 beeps).
- 5** You will automatically be returned to the Operator Display Parameters screen.
- 6** When you have adjusted the display to your satisfaction, press Home to exit this procedure.

**Figure 30.** Example of Calibrating the Touch Screen

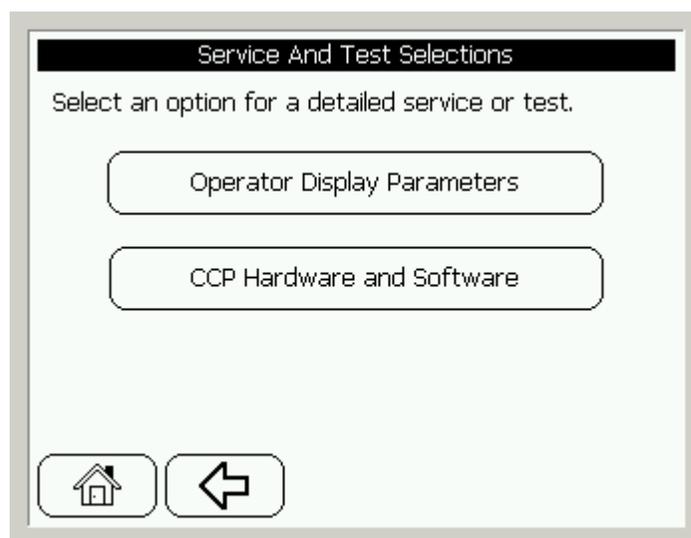


### CCP Hardware and Software Functions

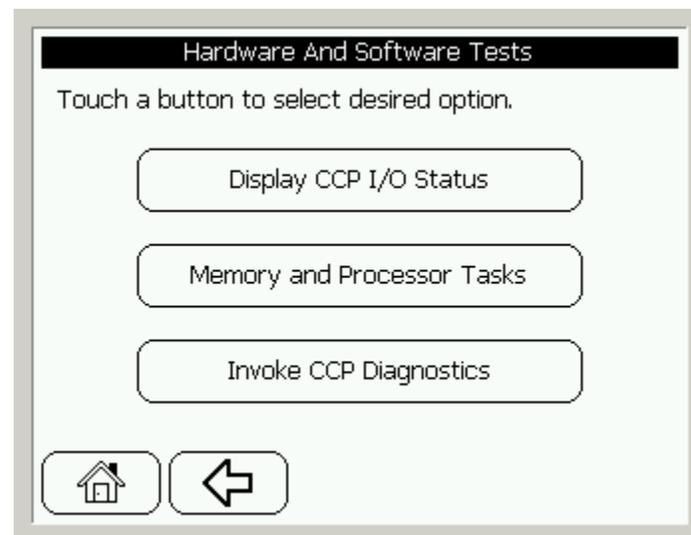
To access CCP Service and Testing from the home screen:

- 1 Press **Advanced**.
- 2 Press **CCP Setup and Service**.
- 3 Press **Service and Testing**. The Service and Test Selections screen displays. (See Figure 31.)
- 4 Press **CCP Hardware and Software**. The Hardware and Software Tests screen displays. (See Figure 32.)

**Figure 31.** Example of Service and Test Selection Screen



**Figure 32.** Example of Selecting Hardware and Software Tests Screen



### ***Display CCP I/O Status***

This screen displays the status of the Priority Shutdown and External Time Clock Inputs located on the CCP subbase. It also displays the status of the spare relay output on the optional relay board.

- 1** Press **Display CCP I/O Status** to view I/O status. The CCP I/O Status screens displays.
- 2** View input/output status of the CCP.
- 3** Press the **Back** arrow. The Hardware and Software Tests screen displays.

### ***Memory and Processor Tasks***

**Rebooting the System.** Rebooting the system allows you to restart the CCP, which is similar to cycling power to the panel.

- 1** Press **Reboot the CCP**. The confirmation screen displays.
- 2** Press **Yes**. The CCP panel reboots and the system recalibrates.

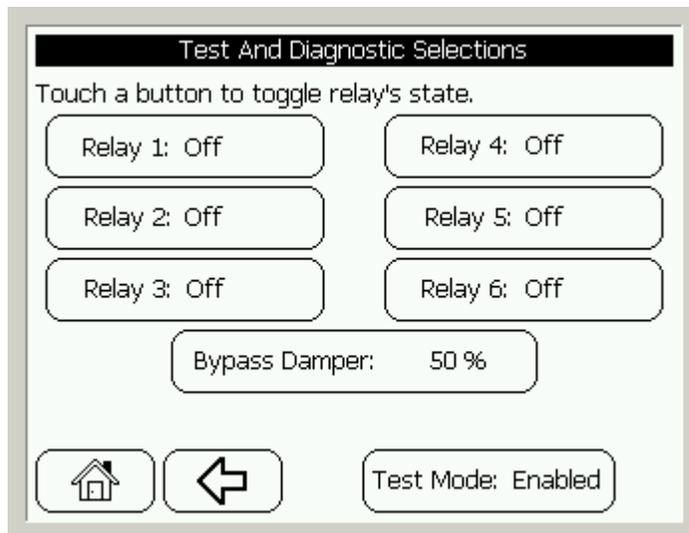
**View Processor and RAM Usage (status only).** Viewing processor and RAM usage is used primarily for development purposes and is typically not utilized during field setup or service.

### ***Invoke CCP Diagnostics (Test Mode)***

The CCP test mode allows you to manually override the CCP relay outputs and the bypass damper for service purposes.

To enter test mode from the home screen:

- 1** Press **Advanced**. The Setup and Status Selections screen displays.
- 2** Press **CCP Setup and Service**. The CCP Setup and Service screen displays.
- 3** Press **Service and Testing**. The Service and Test Selections screen displays.
- 4** Press **CCP Hardware and Software**. The Hardware And Software Tests screen displays.
- 5** Press **Invoke CCP Diagnostics**. The Test and Diagnostics Selections screen displays. (See Figure 33.)
- 6** Press **Test Mode: Disabled**. The current status of the test mode is displayed. A warning screen displays to caution you about proper use of test mode.
- 7** Press **Yes** to continue. A test mode enable/disable screen displays.
- 8** Press **Enable** to continue.
- 9** Press **Yes** to the verification screen to continue. The Test and Diagnostics Selections screen displays.

**Figure 33.** Example of Test and Diagnostics Selection Screen

The buttons on the screen allow you to turn the six relays on the optional relay board on and off to verify operation. The bypass damper button will allow you to enter a position value between 0 percent and 100 percent to verify damper operation.

**Terminate Test Mode.** When finished using the test mode function, the mode must be properly terminated.

- 1** Press **Test Mode: Enabled**. The current status of the test mode is displayed. A warning screen displays a caution of proper use of the test mode.
- 2** Press **Yes** to continue. A test mode enabled/disabled screen will appear.
- 3** Press **Disabled** to continue.
- 4** Press **Yes** on the verification screen to continue. The Test and Diagnostics Selections screen displays.
- 5** Press **Home** to exit this procedure.

## System Setup and Status

The **System Setup and Status** section of Advanced functions allows you to perform in-depth setup and monitoring of the VariTrac system and associated HVAC units. There are two parts to this section:

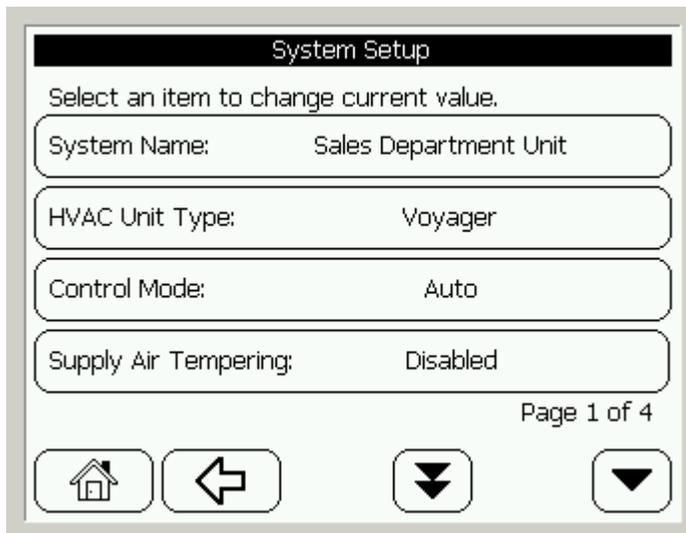
- System Setup
- System Status

### System Setup

To access **System Setup** from the VariTrac home screen:

- 1** Press **Advanced**.
- 2** Press **System Setup and Status**.
- 3** Press **System Setup**.
- 4** The first **System Setup** screen appears. (See Figure 34.) System Setup consists of four screens. Navigate through the screens using the Up or Down arrows.

**Figure 34.** Example of System Setup Screen, page 1



System Setup

Select an item to change current value.

System Name:	Sales Department Unit
HVAC Unit Type:	Voyager
Control Mode:	Auto
Supply Air Tempering:	Disabled

Page 1 of 4

Home Back Down



### **System Name**

Press **System Name** to enter a description name for the VariTrac CCP. The name can contain a maximum of 24 characters, including spaces. The default name is VariTrac CCP. (See Figure 34.)

### **HVAC Unit Type**

Press **HVAC Unit Type** to select a unit type. The VariTrac system configures this parameter automatically on start-up, with the exception of Generic Heat Pump which must be selected manually. The default unit type is Relay Board 2H2C. (See Figure 34.)

### **Control Mode**

Press **Control Mode** to select a manual control mode for the HVAC unit. The default mode is auto, which allows the system to change automatically between the heating and cooling modes. This is the recommended setting for VariTrac. You may manually select heat, cool, or off. The system remains in the manually selected mode until it is manually returned to the auto mode. (See Figure 34.)

### **Supply Air Tempering**

This button only appears if the HVAC unit is a Voyager or Reliatel rooftop unit. Press this button to enable the Supply Air Tempering function in a Voyager via the CCP. When enabled, the Voyager cycles a stage of heat on and off to warm up the supply air stream and better manage the load created by increased ventilation air requirements. The VariTrac system must be in the heating mode and not calling for heat. When the supply air temperature falls 10°F below the supply air tempering setpoint (default 70°F), the Voyager turns on a stage of heat. The stage turns off when the supply air temperature rises 10°F above the supply air tempering setpoint. This process continues until the VariTrac system calls for heat or the system mode changes to cool. The supply air tempering setpoint can be adjusted via the VariTrac PC software. (See Figure 34.)

### **Discharge Cooling Setpoint**

Press **Discharge Cooling Setpoint** to change the discharge cooling setpoint. The VariTrac CCP controls supply air temperature using a discharge air control algorithm. When the VariTrac system is in the cooling mode and there is a call for cool from a zone, the CCP controls to the discharge cooling setpoint (default 55°F). The control algorithm is both deviation- and time-based. This allows the CCP to adjust the number of stages required and the stage cycle rate for the most consistent supply air temperature control. The control algorithm meets the minimum on- and off-time requirements when adjusting stages. (See Figure 35.)

### **Discharge Heating Setpoint**

Press **Discharge Heating Setpoint** to change the discharge heating setpoint. The VariTrac CCP controls supply air temperature using a discharge air control algorithm. When the VariTrac system is in the heating mode and there is a call for heat from a zone, the CCP controls to the discharge heating setpoint (default 110°F). The control algorithm is both deviation- and time-based. This allows the CCP to adjust the number of stages required and the stage cycle rate for the most consistent supply air temperature control. The control algorithm meets the minimum on- and off-time requirements when adjusting stages. (See Figure 35.)

### Minimum Opposite Callers

Press **Minimum Opposite Callers** to change the minimum number of normal callers required for changeover (default 2, data entry range 1–4). The VariTrac CCP requires a minimum number of opposite calls to change over. All current mode callers must be satisfied before the system is allowed to change over. A minimum time between changeovers of 15 minutes (factory default) is enforced. The counter begins running immediately after a changeover occurs and must expire before changeover is allowed. The time remaining on the counter is displayed on another screen. (See Figure 35.)

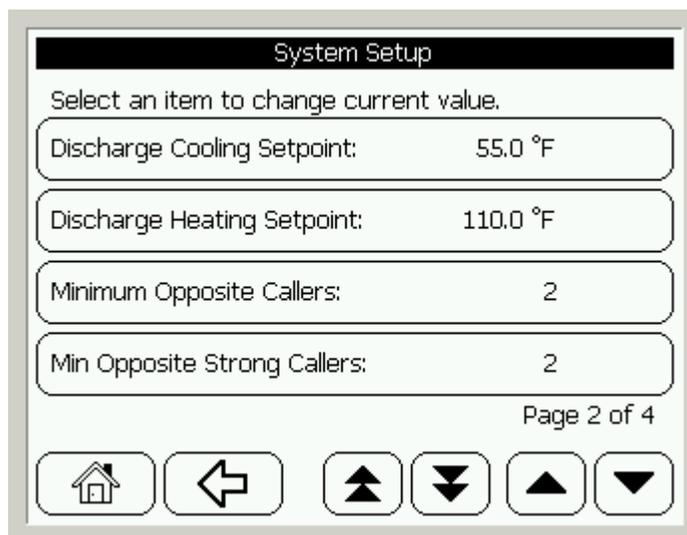
*Example:* Minimum opposite calls to changeover is set to 2. If the system is in the heating mode and three zones are calling for heat, all three zones must be satisfied. If two or more zones are calling for cooling, and if the changeover and all minimum on/off times are satisfied, the system changes over.

### Minimum Opposite Strong Callers

Press **Minimum Opposite Strong Callers** to change the minimum number of strong callers required for changeover (default 2, data entry range 1–4). A heat/cool changeover also occurs if enough opposite strong callers exist. (Strong callers are described in Zone Heat/Cool Call Strength, p. 14.) All current mode callers *do not* have to be satisfied, but the minimum time to changeover and all minimum on/off timers must expire before changeover is allowed. (See Figure 35.)

**Note:** During the unoccupied mode (*all* groups unoccupied), the minimum opposite calls to changeover automatically changes to one so any opposite strong caller can change the system operating mode.

**Figure 35.** Example of System Setup Screen, page 2



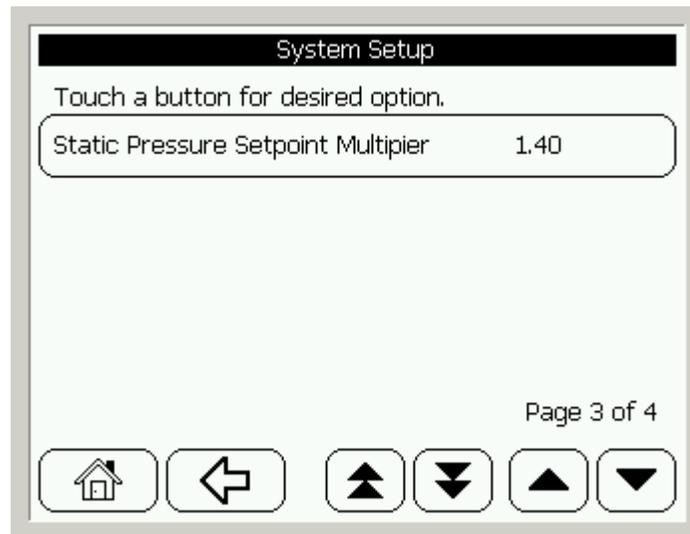
### Static Pressure Setpoint Multiplier

Press **Static Pressure Setpoint Multiplier** to change the static pressure setpoint multiplier. The VariTrac CCP controls the bypass damper(s) using measured duct static pressure. The CCP compares the measured static pressure to the static pressure setpoint. (See Figure 36.)

The static pressure setpoint is calculated by taking the reference static determined at full flow during calibration and multiplying it by the static pressure setpoint multiplier edited here (default 1.4, data entry range 1.0 to 2.0).

To increase the static pressure setpoint, raise the multiplier. To decrease the static pressure setpoint, reduce the multiplier.

**Figure 36.** Example of System Setup Screen, page 3

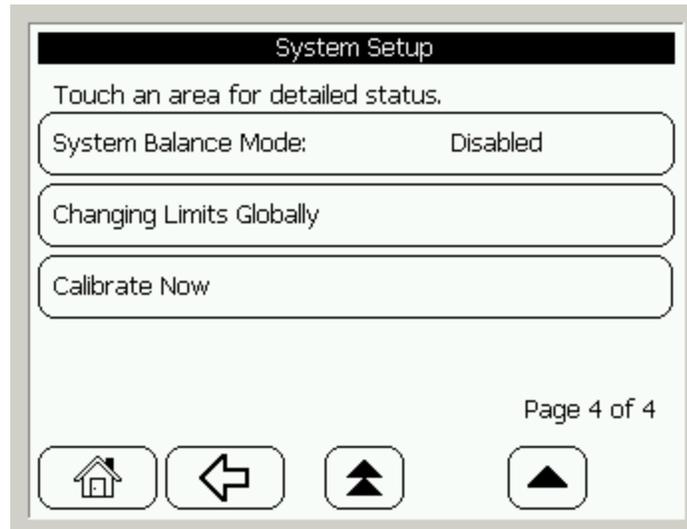


### System Balance Mode

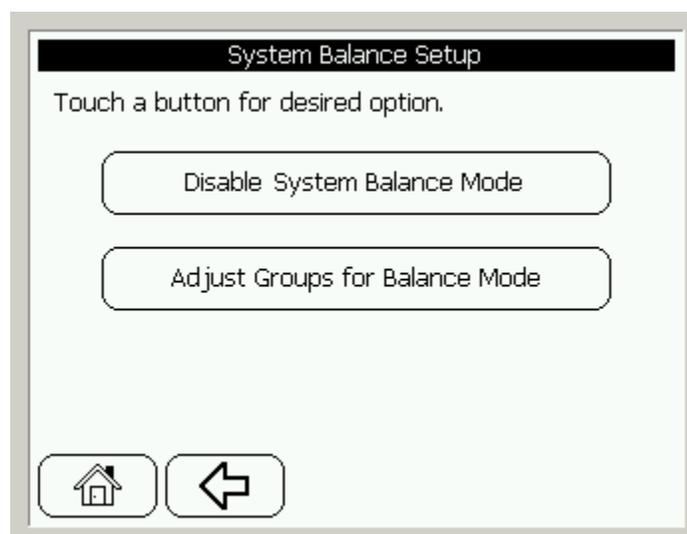
In this mode, the CCP automatically prepares the VariTrac system for balancing by starting the supply fan, disabling heating and cooling, closing the bypass damper, and opening all zone dampers to their maximum position. (See Figure 37.)

- 1 Press **Enable System Balance Mode**.
- 2 Press **Enabled**.
- 3 Press **Yes** to verify your entry. The System Balance Setup screen displays. (See Figure 38.)

**Figure 37.** Example of System Setup Screen, page 4



**Figure 38.** Example of Setting Up System Balance Setup Screen



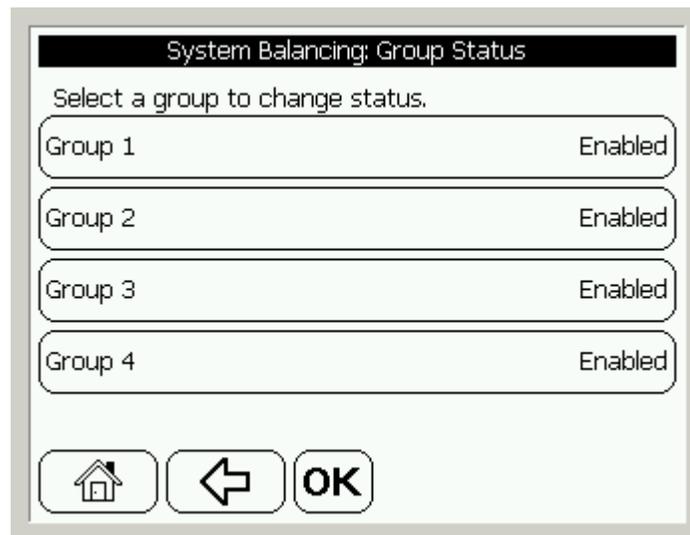
Notice that the button text has changed to Disable System Balance Mode, indicating that the balance mode is currently enabled. The system remains in the balance mode until manually disabled.

### Adjust Groups for Balance Mode

Balance mode allows you to close groups of dampers. This shuts off a portion of the ductwork to compensate for airside diversity.

- 1 Press **Adjust Groups for Balance Mode**. The System Balancing: Group Status screen displays. (See Figure 39.)
- 2 When a group button is pressed, the button changes from enabled to disabled. Select the groups you wish to disable (close).
- 3 Press **OK**. The System Balance Setup screen reappears.
- 4 All the dampers assigned to the selected groups are driven from the maximum position to the closed position.

**Figure 39.** Example of System Balancing: Group Status Screen



### Disabling the System Balance Mode

- 1 Press **Advanced**.
- 2 Press **System Setup and Status**.
- 3 Press **System Setup**.
- 4 Press the **Last** page arrow button (double arrow).
- 5 Press **System Balance Mode**. The System Balance Setup screen displays.
- 6 Press **Disable System Balance Mode**.
- 7 Press **Disabled**.
- 8 Press **Yes** to verify your entry. The System Balance Setup screen displays.

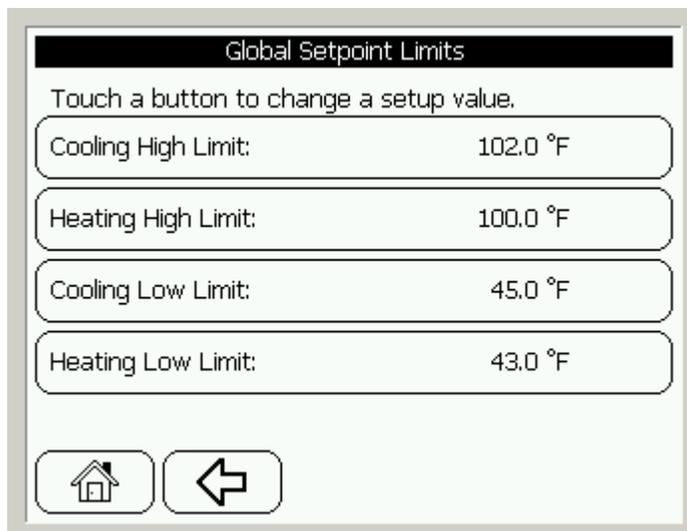
Notice that the button text has changed to Enable System Balance Mode, indicating that the balance mode has been disabled. This also automatically releases any overridden groups back to their auto-flow function.

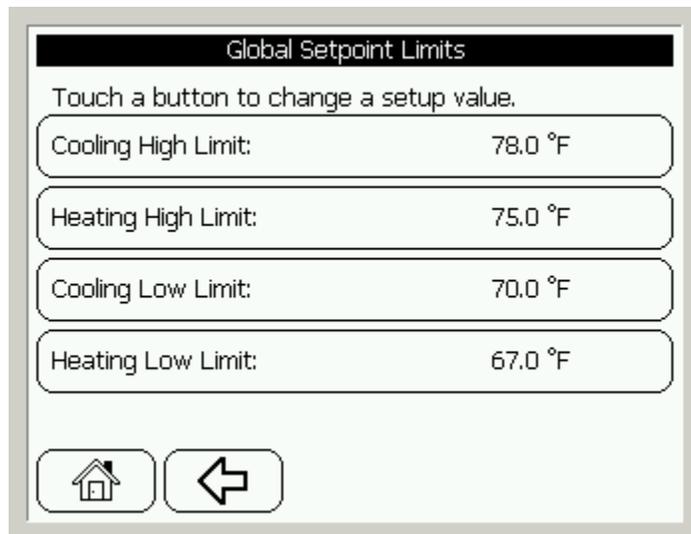
### Changing Limits Globally

If the zone sensor setpoint thumbwheel attached to a zone UCM is enabled, the thumbwheel becomes the active occupied setpoint. The setpoint thumbwheel can be set anywhere from 50°F to 95°F. Reduce this range to 6°F or less during system commissioning. The VariTrac CCP allows you to create a single set of limits for the zone sensor setpoint thumbwheels and broadcast them to all the zones on the system at one time.

- 1 Press the **Changing Limits Globally** button. The Global Setpoint Limits screen appears. (See Figure 40.)
- 2 Press each setpoint and enter the desired value. Figure 41 displays suggested settings.

**Figure 40.** Example of Global Setpoint Limits Screen



**Figure 41.** Example of Global Setpoint Limits Screen with Suggested Settings

When you have completed editing the setpoint limits, press **Back**. When you exit the Global Setpoint Limits screen, the limits broadcast automatically to all the VAV UCMs on the communications link.

### **Calibrate Now**

The system calibration function calibrates the VAV UCMs and determines the static pressure operating setpoint for the system. (See Bypass Calibration, p. 11.) The **Calibrate Now** button manually forces the system to go through the calibration sequence.

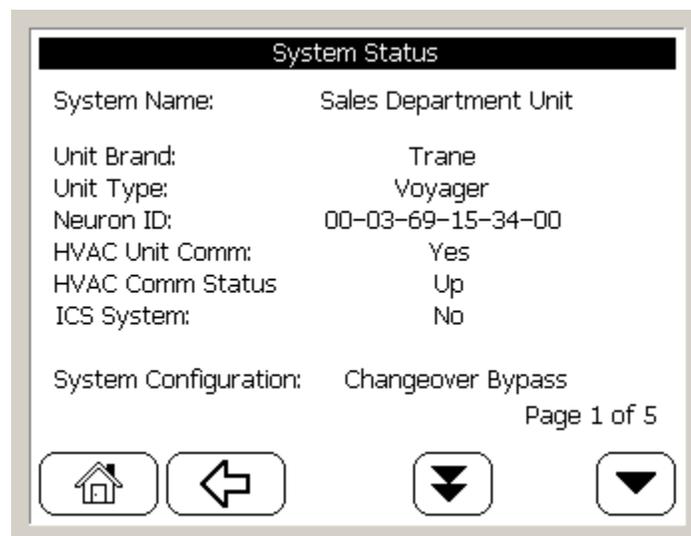
- 1** Press **Calibrate Now**.
- 2** Press **No** if you wish to cancel your selection.
- 3** Press **Yes** to verify your selection. The CCP returns to the home screen and begins the calibration sequence.

## System Status

There are five system status screens. Navigate from screen to screen using the **Up** and **Down** arrows. To access system status from the home screen:

- 1** Press **Advanced**.
- 2** Press **System Setup and Status**.
- 3** Press **System Status**. The first System Status screen displays. (See Figure 42.)

**Figure 42.** Example of System Status Screen, page 1



**System Name.** Identifies this VariTrac system by name (editable)

**Unit Type.** HVAC unit type for which the CCP is configured

**Neuron ID.** Echelon Neuron ID of this CCP

**HVAC Unit Comm.** Indicates whether the CCP has ever communicated with a Voyager or Reliabel rooftop unit

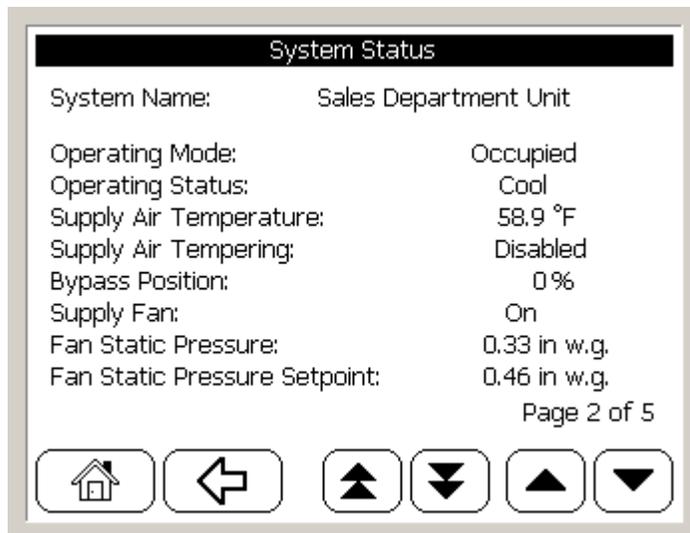
**HVAC Comm Status.** Indicates whether communications to the HVAC unit are presently up or down (*This line appears only when connected to a Voyager or Reliabel unit.*)

**ICS System.** Indicates whether the CCP has ever communicated with an ICS system, such as Tracker Version 10

**ICS Comm Status.** Is communication to the ICS system presently up or down (*This line appears only if the CCP has communicated with an ICS system.*)

**System Configuration.** Indicates whether the CCP has auto configured to a changeover bypass or delivered VAV system

**Figure 43.** Example of System Status Screen, page 2



**System Name.** Identifies this VariTrac system by name (editable)

**Operating Mode.** Indicates whether the occupied or unoccupied mode is currently in effect

**Operating Status.** Current operating status of the system. Options are fan only, morning warm-up, precool, heat, cool, or off

**Supply Air Temperature.** The supply temperature currently communicated by the duct sensor assembly

**Supply Air Tempering.** Indicates whether supply air tempering is presently enabled or disabled (*This line appears only when connected to a Voyager or Reliabel unit.*)

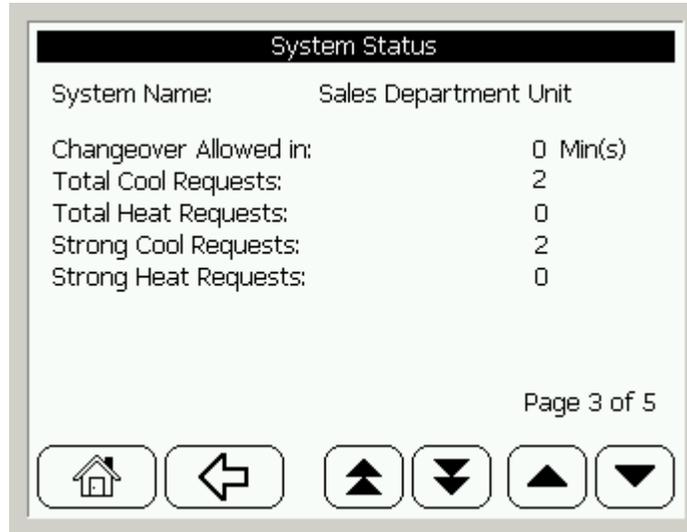
**Bypass Position.** Indicates the bypass position currently communicated by the duct sensor assembly (range 0–100%, where 0 = closed)

**Supply Fan.** Indicates whether the supply fan is currently on or off (delivered VAV systems indicate fan volume 0–100%)

**Fan Static Pressure.** Shows the duct static pressure currently communicated by the duct sensor assembly

**Fan Static Pressure Setpoint.** Shows the static pressure setpoint that the CCP is currently using to control the bypass damper

**Figure 44.** Example of System Status Screen, page 3



**System Name.** Identifies this VariTrac system by name (editable)

**Changeover Allowed In.** Time remaining before changeover is allowed

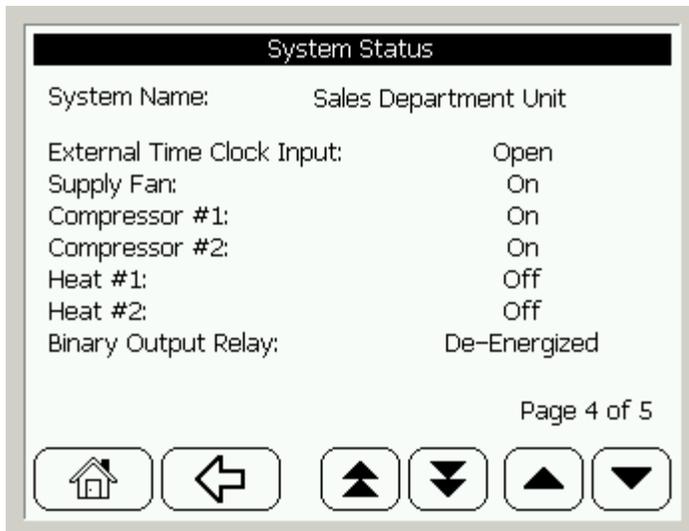
**Total Cool Requests.** Sum total of normal and strong cool callers

**Total Heat Requests.** Sum total of normal and strong heat callers

**Strong Cool Requests.** Shows how many of the total cool callers are strong callers

**Strong Heat Requests.** Shows how many of the total heat callers are strong callers

**Figure 45.** Example of System Status Screen, page 4



**System Name.** Identifies this VariTrac system by name (editable)

**External Time Clock Input.** Indicates whether the time clock input on the CCP subbase is presently open or closed

**Supply Fan.** Indicates whether the supply fan presently on or off

**Compressor #1.** Indicates whether the Compressor #1 is presently on or off

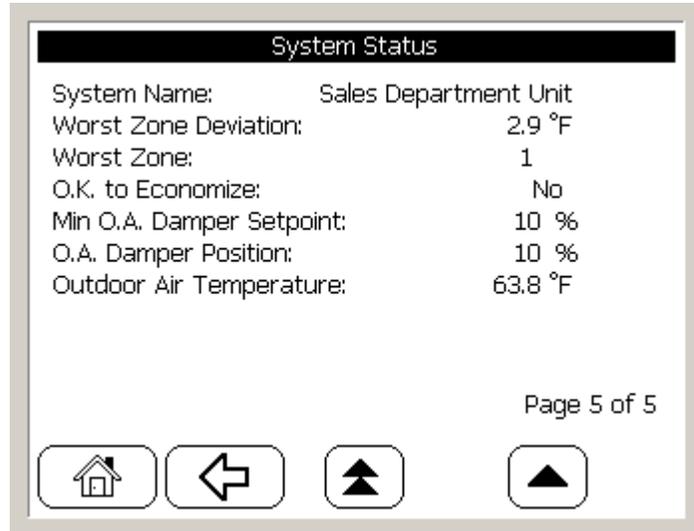
**Compressor #2.** Indicates whether Compressor #2 is presently on or off

**Heat #1.** Indicates whether heat stage #1 is presently on or off

**Heat #2.** Indicates whether heat stage #2 is presently on or off

**Binary Output Relay.** Indicates whether the spare output (6<sup>th</sup> relay) on the relay board is presently energized or de-energized

**Figure 46.** Example of System Status Screen, page 5



**System Name.** Identifies this VariTrac system by name (editable)

**Worst Zone Deviation.** Indicates how far the worst zone (+ or – °F) is from setpoint

**Worst Zone.** Indicates which zone is presently furthest from setpoint

*(The following lines appears only when connected to a Voyager or Reliatel unit with an economizer.)*

**OK to Economize.** Indicates whether outdoor air is currently OK for free cooling

**Min O.A. Damper Setpoint.** Indicates the current ventilation setpoint for the outdoor air damper as a % of damper stroke

**O.A. Damper Position.** Indicates current position of the outdoor air damper as a % of damper stroke

**Outdoor Air Temperature.** Indicates the current temperature as reported by the outdoor air sensor in the Voyager or Reliatel unit

## Zone Setup and Status

The **Zone Setup and Status** section of the Advanced function allows you to perform in-depth setup up and monitoring of the VAV UCMs attached to the system. There are two parts to this section:

- Zone Setup
- Zone Status

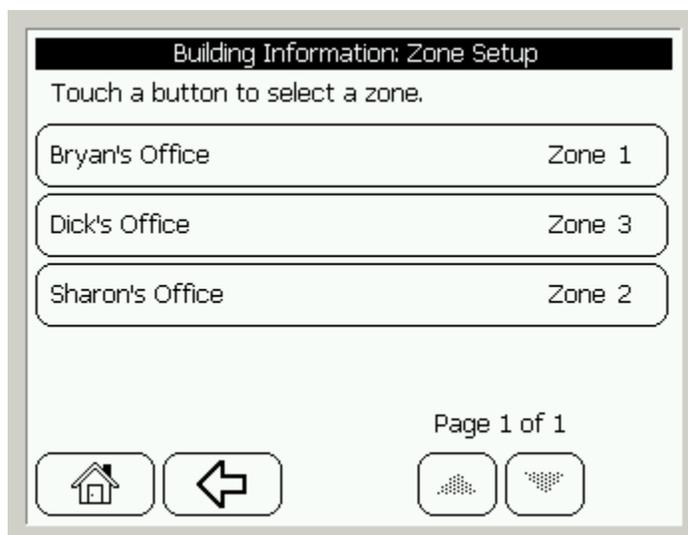
### Zone Setup

Zone Setup consists of five pages. (Page 5 only displays if the VAV UCM is Version 4.0 or later.) Navigate from screen to screen using the Up or Down arrows.

To access zone setup from the VariTrac home screen:

- 1** Press **Advanced**.
- 2** Press **Zone Setup and Status**.
- 3** Press **Zone Setup**. The Building Information: Zone Setup screen appears. (See Figure 47.)
- 4** Select a zone by pressing a button from the zone list. (You may need to use the Up or Down arrows to view all available zones.)

**Figure 47.** Example of Building Information: Zone Setup Screen



### Zone Name

Press **Zone Name** to enter a description name for the Zone. The name can contain a maximum of 24 characters, including spaces. The default name is Zone xx. (See Figure 48.)

### Heat/Cool Vote

Press **Heat/Cool Vote** to enable or disable the heat/cool vote for the zone. Each zone attached to the VariTrac CCP can vote for heating or cooling. Each zone has one vote. A zone can have its vote disabled so that it cannot make the VariTrac system bring on heating or cooling. (See Figure 48.)

### Use Local Setpoint

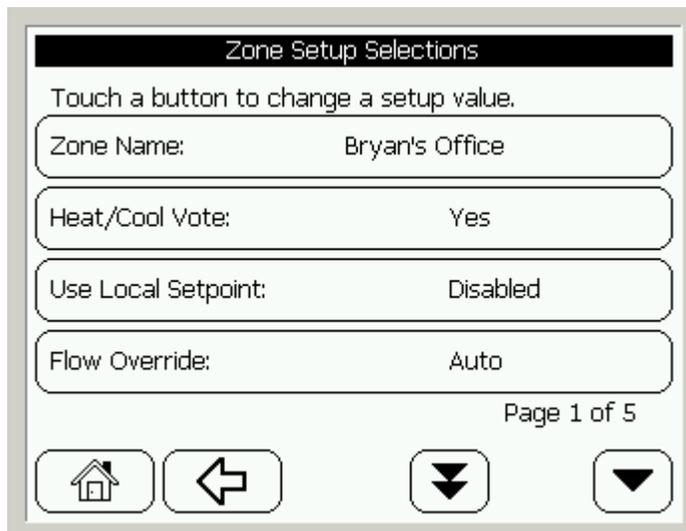
Press **Use Local Setpoint** to enable or disabled the local setpoint in the zone. If the setpoint thumbwheel on the zone sensor is enabled, the thumbwheel becomes the active occupied setpoint (subject to limits). The setpoint at the thumbwheel is the active occupied cooling setpoint. The active occupied heating setpoint defaults 3°F below the cooling setpoint. (See Figure 48.)

### Flow Override

Press **Flow Override** (see Figure 48) to select a damper (air valve) override parameter per one of the following:

- Auto (The zone operates to satisfy zone temperature.)
- Open VAV
- Close VAV
- VAV to Minimum
- VAV to Maximum

**Figure 48.** Example of Zone Setup Screen



Zone Setup Selections

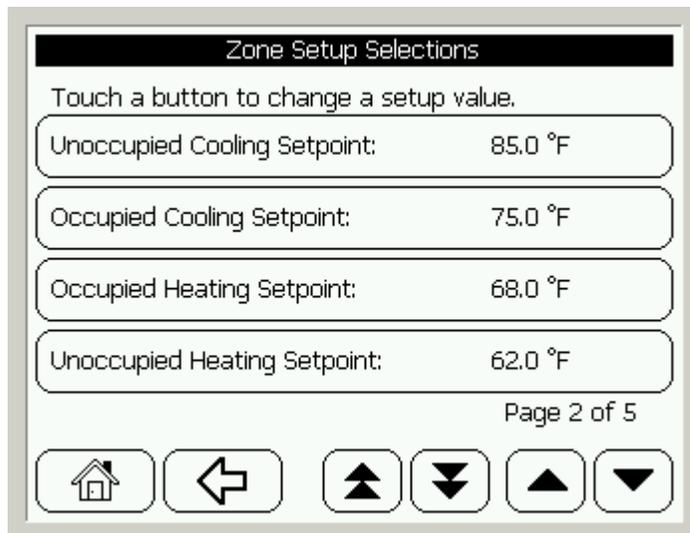
Touch a button to change a setup value.

Zone Name:	Bryan's Office
Heat/Cool Vote:	Yes
Use Local Setpoint:	Disabled
Flow Override:	Auto

Page 1 of 5

Home Left Arrow Down Arrow Right Arrow

**Figure 49.** Example of Zone Setup Selections Screen, page 2



#### **Unoccupied Cooling Setpoint**

Press **Unoccupied Cooling Setpoint** to change the unoccupied cooling setpoint for the zone.

#### **Occupied Cooling Setpoint**

Press **Occupied Cooling Setpoint** to change the occupied cooling setpoint for the zone. This setpoint is active if the setpoint thumbwheel on the zone sensor is disabled, failed, or unavailable.

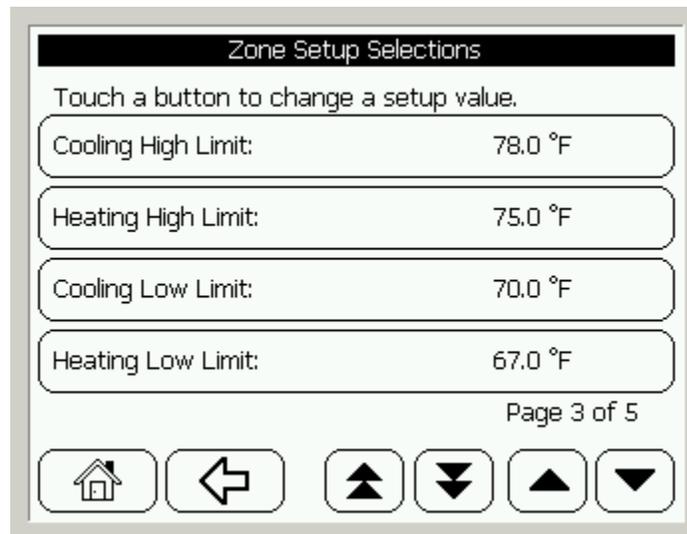
#### **Occupied Heating Setpoint**

Press **Occupied Heating Setpoint** to change the occupied heating setpoint for the zone. This setpoint is active if the setpoint thumbwheel on the zone sensor is disabled, failed, or unavailable.

#### **Unoccupied Heating Setpoint**

Press **Unoccupied Heating Setpoint** to change the unoccupied heating setpoint for the zone.

**Figure 50.** Example of Zone Setup Selections Screen, page 3



### Zone-Sensor Setpoint Limits

If the setpoint thumbwheel on the zone sensor attached to a zone UCM is enabled, the thumbwheel becomes the active occupied setpoint. The setpoint thumbwheel can be set anywhere from 45°F to 100°F. Reduce this range to 6°F or less during system commissioning.

#### Cooling High Limit

Press **Cooling High Limit** to change the local setpoint cooling high limit for the zone.

#### Heating High Limit

Press **Heating High Limit** to change the local setpoint heating high limit for the zone.

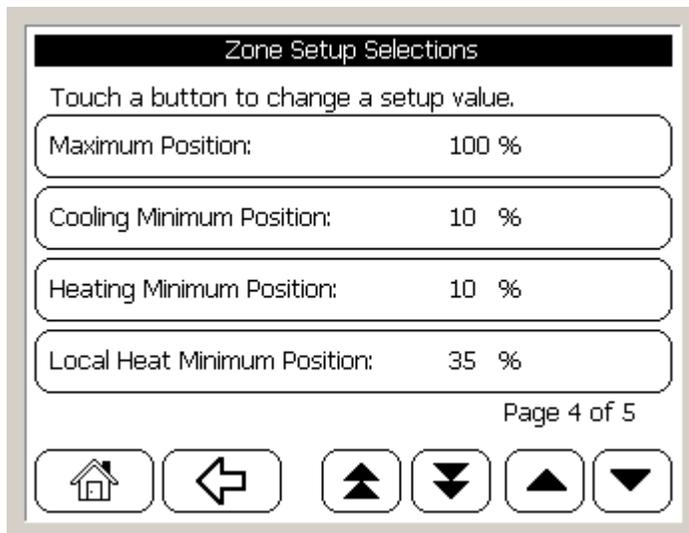
#### Cooling Low Limit

Press **Cooling Low Limit** to change the local setpoint cooling low limit for the zone.

#### Heating Low Limit

Press **Heating Low Limit** to change the local setpoint heating low limit for the zone.

**Figure 51.** Example of Zone Setup Selections Screen, page 4



#### **Airflow Maximum Position**

Airflow values display in percent open for VariTrac pressure-dependent dampers and in flow rate for VariTrane pressure-independent boxes.

Press **Maximum Position** to edit the zone maximum position setpoint. This is the maximum position to which the damper opens, unless overridden by a drive-open command.

#### **Airflow Cooling Minimum Position**

Press **Cooling Minimum Position** to edit the zone cooling minimum position setpoint. This is the minimum position to which the damper closes when in the cool mode, unless overridden by a drive-closed command or by initiation of the energy-saver mode.

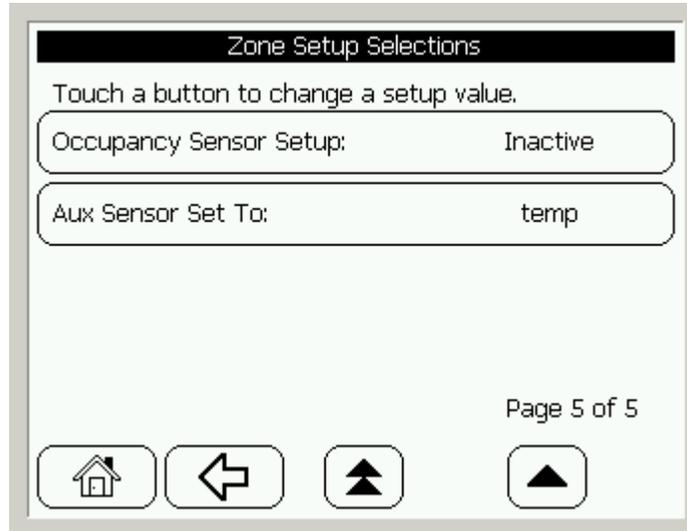
#### **Airflow Heating Minimum Position**

Press **Heating Minimum Position** to edit the zone heating minimum position setpoint. This is the minimum position to which the damper closes when in the heat mode, unless overridden by a drive-closed command.

#### **Local Heat Minimum Position (UCM 4.0 and later)**

Press **Local Heat Minimum Position** to edit the zone local heat minimum position setpoint. This is the minimum position to which the damper closes when local heat is energized, unless overridden by a drive-closed command (available in UCM Version 4.0 and later). Local heat must be present and the setpoint must be manually activated to become functional.

**Figure 52.** Example of Zone Setup Selections Screen, page 5



#### **Occupancy Sensor Setup** (UCM 4.0 and later)

Press **Occupancy Sensor Setup** to enable or disable the occupancy-sensor input for the occupied-standby function.

A VariTrac UCM can be configured to perform a zone-occupied standby function. Occupied standby allows a zone to hold at its unoccupied setpoints until an occupancy sensor signals activity in the zone. The UCM then controls to its occupied setpoints. Thirty minutes after space activity ceases, the UCM returns to the occupied standby mode and again enforces the unoccupied setpoints. This function is only active when the VariTrac system is in the occupied mode. This function only affects the behavior of the zone being served by the UCM, and has no impact on the occupied/unoccupied state of the system. If the system is in the unoccupied mode, the UCM functions as it normally would and enforces its unoccupied setpoints.

#### **Aux Sensor Set To** (UCM 4.0 and later)

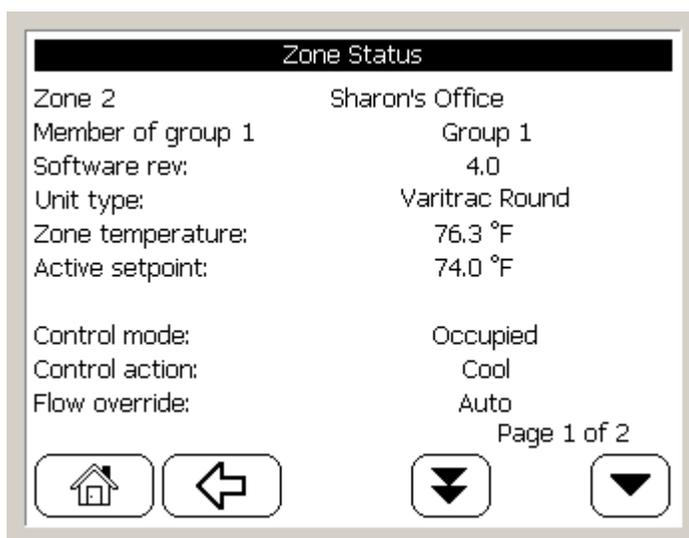
Press **Aux Sensor Set To** to select the type of sensor input, either temperature or CO<sub>2</sub>. The UCM supports only one auxiliary sensor. You must choose either temperature or CO<sub>2</sub> in the Setup menu for the zone UCM. The CO<sub>2</sub> sensor is attached to the auxiliary sensor input on the zone UCM. The input defaults to temperature. The CO<sub>2</sub> value is communicated to the VariTrac CCP for system use.

## Zone Status

To go to Zone Status, from the VariTrac home screen:

- 1** Press **Advanced**.
- 2** Press **Zone Setup and Status**.
- 3** Press **Zone Status**. The Building Information: Zone Status screen appears. (See Figure 53.)
- 4** Select a zone by pressing a button from the zone list. (You may need to use the Up or Down arrow to view all available zones.)

**Figure 53.** Example of Zone Status Screen, page 1



**Zone number and name.** The zone number based on the UCM address and the current edited name of the VariTrac zone

**Member of group x.** Indicates the group to which this VariTrac zone belongs

**Software rev.** Indicates the version of the VAV UCM

**Unit type.** Indicates the type of VAV unit the UCM is configured to control

**Zone temperature.** Indicates the current zone temperature as reported by the zone sensor

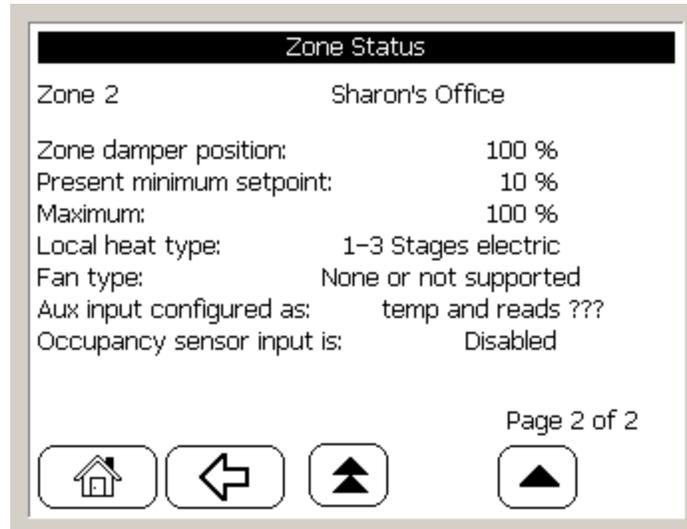
**Active setpoint.** The setpoint to which the zone is currently controlling

**Control mode.** Indicates whether the zone is currently occupied or unoccupied

**Control action.** Indicates whether the current zone control action is heat or cool

**Flow override.** Indicates the zone presently running in auto control mode, or if the flow has been manually overridden

**Figure 54.** Example of Zone Status Screen, page 2



**Zone number and name.** The zone number based on the UCM address and the current edited name of the VariTrac zone

**Zone damper position.** Current position of the damper as a percentage (This will appear as cfm if the zone is configured to measure flow.)

**Present minimum setpoint.** Current edited minimum damper position as a percentage (This will appear as cfm if the zone is configured to measure flow.)

**Maximum.** Current edited maximum damper position as a percentage (This will appear as cfm if the zone is configured to measure flow.)

**Local heat type.** Indicates whether the zone is configured to control local heat and indicates the type of heat

**Fan type.** Indicates whether the zone is configured to control a series or parallel fan powered VAV box and indicates the type of fan

**Aux input configured as.** Indicates whether the zone UCM auxiliary input is configured for CO<sub>2</sub> or temperature, and indicates the current value

**Occupancy sensor input is.** Indicates whether occupancy input is enabled or disabled (*This line appears on UCM Version 4 and later.*)

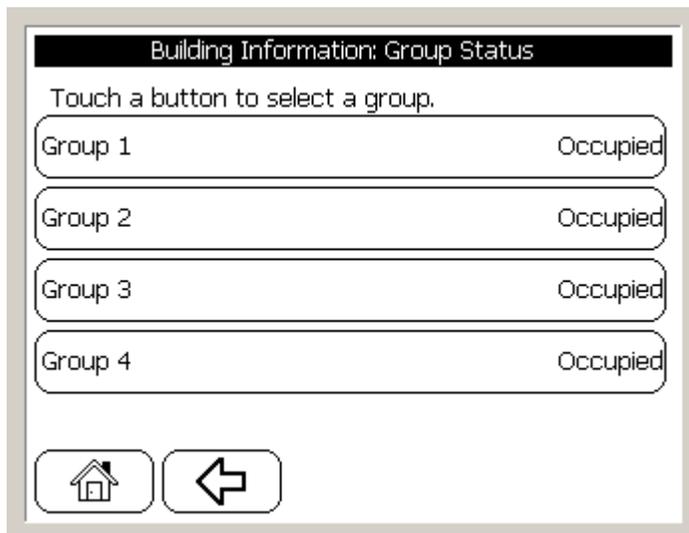
## Group Setup

The **Group Setup** section allows you to access the setup functions and overrides for the four groups, and assigns the VAV UCMs attached to the system to one of the four groups.

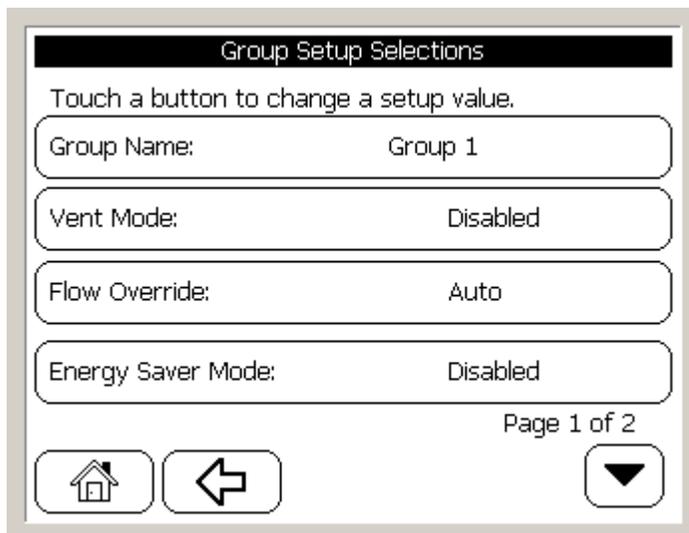
To access Group Setup from the home screen:

- 1** Press **Advanced**.
- 2** Press **Group Setup**. The Building Information: Group Status screen displays. (See Figure 55.)
- 3** Press a group button to select a group from the list. The Group Setup Selections screen displays. (See Figure 56.)

**Figure 55.** Building Information: Group Status Screen



**Figure 56.** Group Setup Selections Screen, page 1



### Group Name

Press **Group Name** to enter a group description. The name can contain a maximum of 24 characters, including spaces. The default name is Group x.

### Vent Mode

Press **Vent Mode** to enable or disable the ventilation mode for the group. When enabled, this mode allows dampers to open for greater ventilation. This occurs when the group is occupied and the air-conditioning system is in “zero energy” state (no stages of heating or cooling energized) for more than four minutes. When the ventilation mode is active, the vent flow multiplier is not allowed to drop below 4.0. For example, if the cooling minimum position is set to 10 percent, the damper goes to 40 percent ( $10\% \times 4.0 = 40\%$ ) open during the ventilation mode.

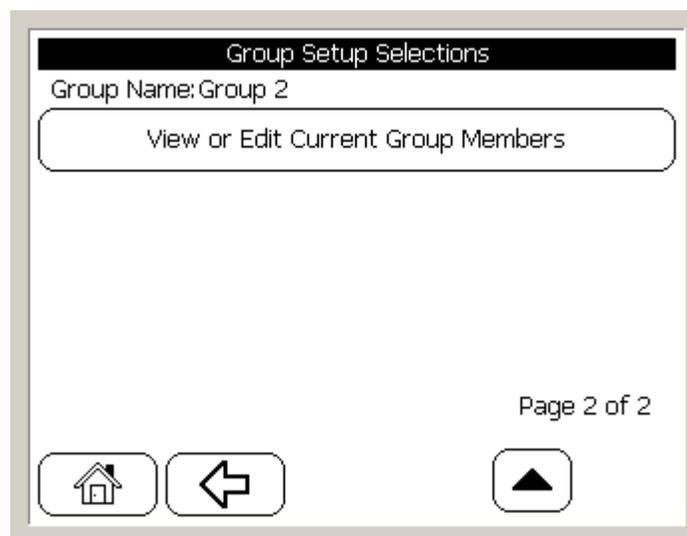
### Flow Override

Press **Flow Override** to access the manual flow override screen. The group flow control defaults to auto. The member zones modulate their dampers following temperature versus setpoint demand. The group members zone damper position can be manually overridden to continuous open, closed, minimum, or maximum.

### Energy Saver Mode

Press **Energy Saver Mode** to enable or disable the energy saver mode for the group. When enabled, the energy saver mode allows zones to close below their minimum. This only occurs if a zone is in the cooling mode with a zone temperature lower than the active heating setpoint, or in the heating mode and with a zone temperature greater than the active cooling setpoint. This feature limits counterproductive air entering a zone.

**Figure 57.** Example of Group Setup Selections Screen, page 2



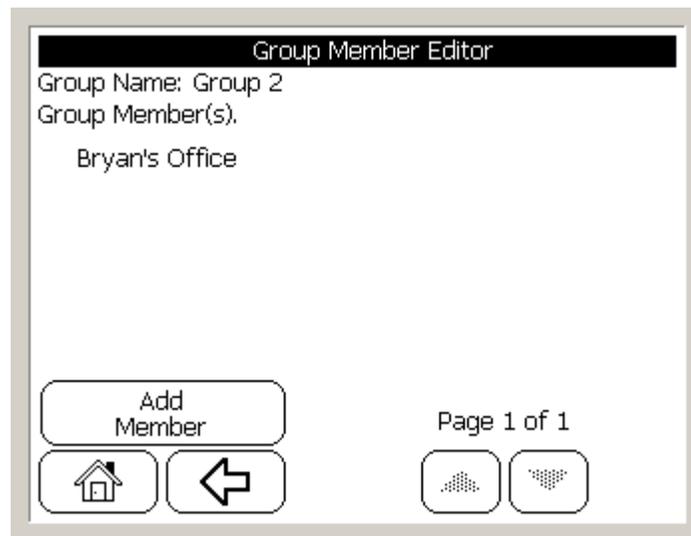
### View or Edit Current Group Members

Each group can have up to 24 members (32 for delivered VAV). A zone can be assigned to any group, but a zone can only be a member of one group at a time. By default, all zones are assigned to Group 1.

To change the zone membership for the group:

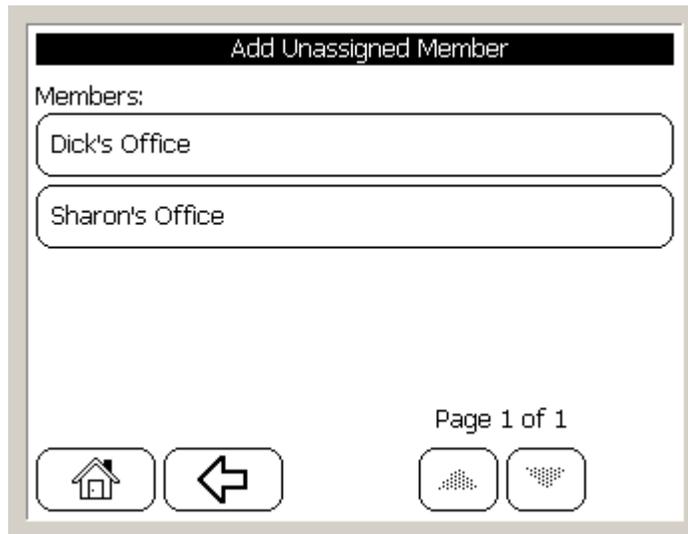
- 1 Press **View or Edit Current Group Members** button. The Group Member Editor screen displays the current group members. (See Figure 58.)
- 2 Press **Add Member** to add a new member to this group. The Add Unassigned Member screen displays.

**Figure 58.** Example of Group Member Editor



- 3 Press the button of the zone you wish to add to this group.
- 4 When the confirmation screen appears, press **OK** to add the zone to the group.
- 5 The Add Unassigned Member screen reappears. Repeat Steps 2-4 to add more zones, or press **Home** to exit this procedure.

**Figure 59.** Example of Add Unassigned Member Screen





**Trane**  
**A business of American Standard Companies**  
**[www.trane.com](http://www.trane.com)**

*For more information contact  
your local district office or  
e-mail us at [comfort@trane.com](mailto:comfort@trane.com)*

Literature Order Number	VAV-SVU01A-EN
File Number	SV-AH-VAV-000-SVU01A-EN-1002
Supersedes	New
Stocking Location	La Crosse

*Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice. Only qualified technicians should perform the installation and servicing of equipment referred to in this publication.*