



UVC Programming and Monitoring Instructions

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Description

Unit Ventilator Controllers (UVCs) provide accurate automatic control of heating, cooling, fan, and damper functions of unit ventilators. The modules provide fully distributed digital control. UVC parameters are adjusted via direct communication with the system's executive module.

UVC selection is based primarily on the outputs the user needs to control. (For a list of outputs, refer to Novar's *Unit Ventilator Controller Installation Instructions*, Doc. No. 569027000, available from any authorized Novar Technology Center or account representative.)

Programming Overview

To set or change a UVC's parameters, a user must access the ESS32 Function Menu (Figure 1) and select the **Load Control** option to open the Load Directory.

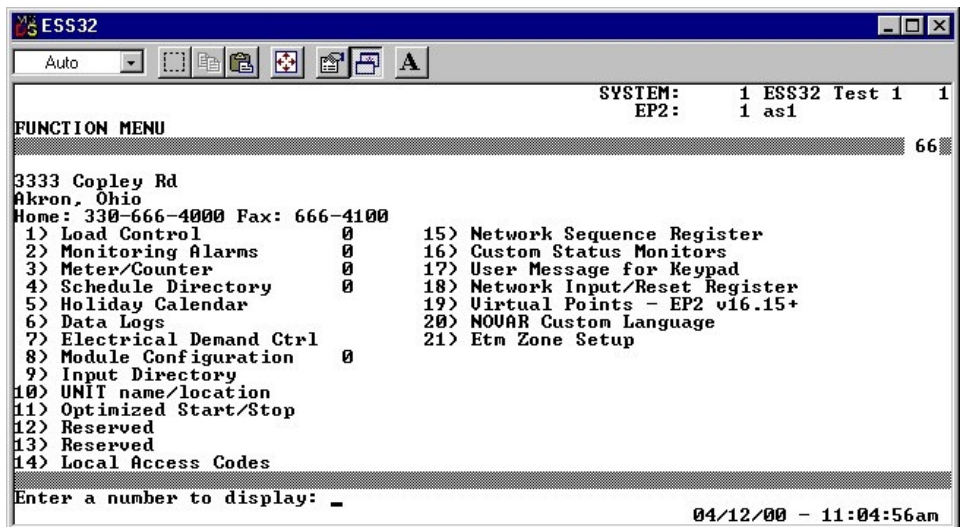


Figure 1. ESS32 Function Menu

The Load Directory screen is used to:

- Create a new UVC load.
- Access a load's Menu screen and Control Settings/Parameters screen to set or modify its parameters.

UVC Programming and Monitoring Instructions

Creating a UVC Load

The following procedure should be used to create anew UVC load.

Step	Procedure
1	Type an unassigned number at the prompt at the bottom of the Load Directory screen and press enter to highlight the field next to that number.
2	Type a name for the load in the highlighted field and press enter to produce a load type popup menu.
3	Use the keyboard arrow keys to move the cursor to and highlight the UVC option and press enter to open a popup menu listing the UVC models compatible with the selected executive module.
4	Use the keyboard arrow keys to move the cursor to and highlight the appropriate UVC model and press enter .

Once the load has been created, it can be programmed.

Modifying/Setting a UVC's Parameters

The parameters for a load are listed in that load's Control Settings/Parameters screen. To access this screen from the Load Directory, the user must:

- Type the load's number at the prompt and press **enter**.
- Select **1** (Modify/Display) and press **enter** to display a Menu screen for that load.
- Select the **Control Settings and Parameters** option and press **enter**.

Figure 2 shows the control settings and parameters available for a UVC-1. Parameters offered for other UVC models may vary slightly.

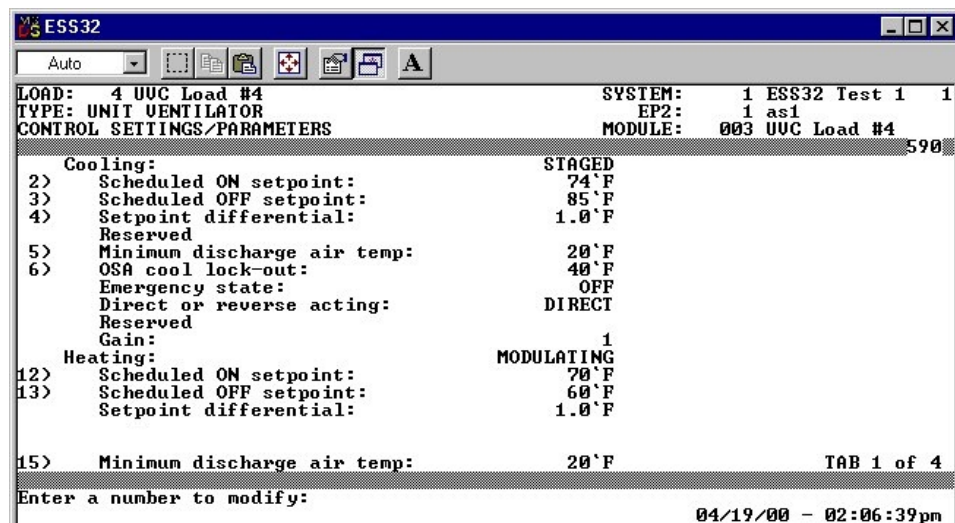


Figure 2. UVC Control Settings/Parameters screen

The “Tab 1 of 4” message in the lower right corner of the screen indicates that the list of parameters takes up four screens. The user can press **tab** to display the parameters listed on the next screen.

To modify a specific parameter, the user must type that parameter’s number on the prompt line at the bottom of the screen and press **enter**. The cursor will move to the field next to the parameter and the prompt line will provide instructions for changing the settings. Once an option has been selected or the correct setting has been entered, the user must press **enter**.

UVC Control Settings and Parameters

Explanations of each of the UVC parameters are provided below.

Cooling Control Settings/Parameters

Cooling

This setting is either staged or modulating depending on the UVC type selected. Changes cannot be made to this field because it is locked in when the UVC type was selected.

Scheduled On Setpoint

This parameter establishes (within the range specified) the cooling setpoint during scheduled on periods.

- Default: 74°F
 - Range: One degree above the Heat Setpoint value to 127°F
-

Scheduled Off Setpoint

This parameter establishes (within the range specified) the cooling setpoint during scheduled off periods.

- Default: 84°F
 - Range: One degree above the Heat Setpoint value to 127°F
-

Setpoint Differential (Staged Cooling only)

This parameter determines a setpoint differential. This setting indicates the difference in degrees for when cooling should turn on and off. The differential is split above and below the setpoint.

- Default: 1.0°F
 - Range: 0.5°F–7.5°F
-

Minimum Discharge Air Temp

This parameter identifies the minimum discharge air temperature while the UVC is in the cooling mode. This control function drives the damper to minimum position and/or disables the cooling operation if the discharge air temperature drops below this setpoint. It can also bring on heating

- Default: 20°F
 - Range: 20°F–127°F
-

OSA Cool Lock-out

This parameter specifies an outdoor temperature below which cooling is locked out.

- Default: 40°F
 - Range: –31°F to 127°F
-

Emergency State

This parameter indicates the position of the control output during an emergency state (available for modulating cooling only).

- Default: Off
- Range: On or Off

Select **On** to drive the controlled device open.
Select **Off** to drive the controlled device closed..

Direct or Reverse Acting

This parameter specifies the direction of the outputs voltage as the space temperature rises (available for modulating cooling only).

- Default: Direct
- Range: Direct or Reverse

Selecting **Direct** increases the voltage output as more cooling is needed.
Selecting **Reverse** decreases the voltage output as more cooling is needed.

Gain (applies to Modulating Cooling only)

This parameter establishes a “speed factor” (a combination of proportional and integral constants) from 1 (slowest) to 8 (fastest) that determines how quickly the output’s voltage level changes. This operation works in conjunction with the **Zone Temperature Sensor Response Time** parameter to control the modulating action of the cooling output.

- Default: 1
 - Range: 1–8
-

Heating Control Settings/Parameters

Heating

This setting is either Staged or Modulating depending on the UVC model selected. Changes cannot be made to this selection because it is locked in when the UVC type was selected.

Scheduled On Setpoint

This parameter specifies the heating setpoint temperature during scheduled on periods within the range specified.

- Default: 70°F
 - Range: 20°F to one degree less than the Cool Setpoint value
-

Scheduled Off Setpoint

This parameter specifies the heating setpoint during scheduled off periods within the range specified.

- Default: 60°F
 - Range: 20°F to one degree less than the Cool Setback value
-

Setpoint Differential (Staged Heating only)

This parameter establishes a setpoint differential temperature that indicates the temperature difference when heating should turn on and off. The differential is split above and below the setpoint.

- Default: 1.0°F
 - Range: 0.5°F–7°F
-

Minimum Discharge Air Temp

This parameter identifies a minimum discharge air temperature between 20°F and 127°F while the UVC is in heating mode. This field modifies the damper and/or heating operation to prevent the discharge air temperature from dropping below this setpoint.

- Default: 20°F
- Range: 20°F–127°F

For convective heating during scheduled off time, the Heating Minimum Discharge Air Temperature must be set higher than the Heating Scheduled Off setpoint.

OSA Heat Lock-out/Heat Output Scaling

If using OSA heat lockout, this parameter specifies an outdoor temperature above which heating is locked out. If using heat output scaling, it defines the voltage control range for the heating output.

Only one function is available for use at a time. (Setting an OSA Lockout Setpoint disables the use of Output Scaling.)

- Default:
 - OSA heat lockout: 70°F
 - Heat output scaling: 0–10 volts
- Range:
 - OSA heat lockout: –31°F to 127°F
 - Heat output scaling: 0–10 volts

Emergency State (Modulating Heating only)

This parameter indicates the position of the control output during an emergency state.

- Default: Off
- Range: Off or On

Select **On** to drive the controlled device open.
Select **Off** to drive the controlled device closed.

Direct or Reverse Acting (Modulating Heating only)

This parameter determines the direction of the outputs voltage as the space temperature decreases.

- Default: Direct
- Range: Direct or Reverse

Selecting **Direct** increases the voltage output as more heat is needed.
Selecting **Reverse** decreases the voltage output as more heat is needed.

Gain (applies to Modulating Heating only)

This parameter establishes a “speed factor” (a combination of proportional and integral constants) from 1 (slowest) to 8 (fastest) that determines how quickly the output’s voltage level changes. This operation works in conjunction with **Zone Temperature Sensor Response Time** parameter to control the modulating action of the heating output.

- Default: 1
 - Range: 1–8
-

Damper Control Settings/Parameters

The settings and parameters in this section control the operation of the damper. This control is normally modulating (except for the UVC-10) and is locked in when the UVC type is selected. The damper is controlled to zone temperature and is modulated to maintain a minimum discharge air temperature.

When the user selects a UVC-10, a choice of ventilation or economizer is available. Ventilation means that the damper cycles with the fan operation. Economizer means the damper operates based on the outside air temperature range and the **Cool Setpoint Offset** parameter setting.

ASHRAE Cycle

ASHRAE Cycle #2 is the only cycle available and cannot be modified. Cycle #2 maintains a minimum damper percent open during occupied hours and also uses the damper for economizer operation. The damper output is not maintained at a minimum position during scheduled off times and remains closed during that time unless needed for economizer operation.

Cool Setpoint Offset

This parameter specifies an offset number that is subtracted from the cooling setpoint to determine the damper setpoint.

- Default: -0.5°F
 - Range: $-0.5, -1.0, -1.5,$ or -2.0
-

Damper OSA High Limit

This parameter specifies an outside temperature from -20°F to 120°F . If the temperature rises above the limit, economizer operation is canceled and the damper moves to the minimum position.

- Default: 65°F
 - Range: -20°F to 120°F
-

Minimum Position

This parameter establishes a percentage figure that sets the damper to provide minimum outside air requirements.

- Default: 0%
- Range: 0%–100%

For example, a 10% setting indicates that the damper will remain at least 10% open during occupied hours (scheduled on). During unoccupied hours (scheduled off) the damper moves to fully closed.

Emergency State

This parameter sets the position of the damper during an emergency state.

- Default: Off
- Range: On or Off

Selecting **On** opens the damper.

Selecting **Off** closes the damper.

Gain (applies to Modulating Cooling only)

This parameter establishes a “speed factor” (a combination of proportional and integral constants) from 1 (slowest) to 8 (fastest) that determines how quickly the output’s voltage level changes. This operation works in conjunction with the **Zone Temperature Sensor Response Time** parameter to control the modulating action of the heating output.

- Default: 1
 - Range: 1–8
-

Warmup Setpoint Adjust

This parameter specifies an offset temperature that keeps the damper closed at morning startup. The cycle occurs whenever the UVC has a schedule transition from scheduled off to scheduled on.

- Default: Setpoint Adjust
- Range: Setpoint Adjust or Inactive (Setpoint Adjust setting range is -7°F to 7°F).

This function reduces operating costs by not conditioning outside air when the building is unoccupied.

Selecting **Active** activates the morning warmup. When the maximum warmup time or the adjusted setpoint (based on the offset) is reached, the warmup cycle terminates.

Example:

If the: Space temperature = 60°F
Heat setback = 60°F
Heat setpoint (scheduled on) = 70°F
Setpoint adjust = -4°F

Then: Warmup control point = 66°F (70°F minus 4°F)

Warmup Timeout

This parameter establishes the maximum length for the warmup cycle. If the modified setpoint is not reached within the time specified, the warmup cycle ends and the damper moves to its minimum position and/or normal control.

- Default: 0 minutes
 - Range: 0–90 minutes
-

Zone Temp Sensor Response Time

This parameter specifies a time that a modulated output waits before adjusting its position. This setting is used to prevent overshoot. It is not used when an output is controlling to its minimum or maximum discharge air temperature setpoint.

- Default: 0 minutes, 0 seconds
 - Range: 0–7 minutes, 0–30 seconds
-

Schedule On Fan Mode

This parameter selects the fans mode of operation during periods when the UVC is scheduled on.

- Default: Auto
- Range: Auto or On

Auto cycles the fan on and off with actual calls for heating or cooling.
On runs the fan constantly during occupied periods.

Schedule Off Fan Mode

This parameter selects the fans mode of operation (automatic or on) during periods when the UVC is scheduled off.

- Default: Auto
 - Range: Auto or On
-

Setpoint Adjust Mode

This parameter enables local heating and cooling setpoint adjustments.

- Default: Inactive
- Range: Inactive, Active Always, Active—Schedule Mode Sensitive

Selecting **Inactive** disables the setpoint adjust mode.

Selecting **Active Always** activates the setpoint adjust mode.

Selecting **Active—Schedule Mode Sensitive** requires the occupant to push the timed override button prior to adjusting the setpoint adjust dial on the auxiliary input during scheduled on times. The adjustment automatically cancels when the unit schedules off. During the scheduled off mode, it is not active. During a timed override mode, it is always active.

Relief Damper

This parameter activates a digital output, usually a relief damper or exhaust fan, that allows the building to vent excess pressure when the unit ventilator brings in fresh air through the economizer damper. The relief damper output can be set to activate when the economizer damper is opened a certain percentage.

- Default: Inactive
- Range: Damper Percent or Inactive
Damper Percent range: 0%–100%

Selecting **Damper Percent** and indicating the percentage activates the relief damper function.

Demand Control

This parameter activates or deactivates the UVC's participation in the executive module's demand control function.

- Default: Inactive
- Range: Active or Inactive

Load shedding is subject to the constraints of the control settings and parameters for each individual load. If a load has been included in one of the shed registers listed under demand control and this setting has been changed to inactive (at a later date), the UVC disregards shedding instructions from the demand control routine.

Demand Active in Cool Mode

This parameter determines if demand control is to be active during cooling.

- Default: No
 - Range: Yes or No
-

Demand Active in Heat Mode

This parameter determines if demand control is to be active during heating.

- Default: No
 - Range: Yes or No
-

Demand Period Continuous Fan

This parameter determines if the fan is to operate continuously during demand shed periods.

- Default: No
- Range: Yes or No

NOTE! Selecting **Yes** does not turn on the fan output during a demand shed if it was off due to a normal control state.

Demand Setpoint Adjust

This parameter determines if the UVC is to turn off or only alter its setpoints by a specified amount during demand shed periods.

- Default: Off
 - Range: Load Shed Off or Setpoint Adjust (Setpoint Adjust range: 0°F–9°F).
-

Optimized Start/Stop

This parameter enables or disables the optimized start/stop function for the equipment controlled by the UVC and specifies the allowable temperature drift during optimized stop.

- Default: Inactive
- Range: Start = Active/Inactive; Stop = Inactive or 2°F–10°F.

A primary schedule must be created before this parameter can be used.

Phase Loss

This parameter activates or deactivates emergency shutdown in the event that the executive module detects a utility phase loss. For the UVC, digital outputs turn off (or open) and modulating outputs return to their defined emergency states during the emergency shutdown.

- Default: Inactive
 - Range: Active or Inactive
-

Drift Limit Alarm

This parameter activates or deactivates a drift limit alarm if the UVC is unable to come within 3°F of its heating or cooling setpoint. The alarm is automatically inhibited as long as the space temperature is approaching setpoint by at least 0.5°F per 10 minutes.

- Default: Inactive
- Range: Active or Inactive

Selecting **Active** displays the drift limit alarm if the UVC is unable to achieve the heating or cooling setpoint. The alarm condition is reported to ESS32.

Selecting **Inactive** displays the drift limit alarm if the UVC is unable to achieve the heating or cooling setpoint. The alarm condition is not reported to ESS32.

Site Emergency

This parameter activates or deactivates emergency shutdown when the executive module detects a site emergency.

- Default: Inactive
- Range: Active or Inactive

Network emergency is shown as active or inactive, but specified from a Monitoring Alarm Output Function parameter.

For the UVC, digital outputs turn off (or open) and modulating outputs return to their defined emergency states during the emergency shutdown.

Network Sequence

If the UVC's operation is dependent upon other equipment in the system, this parameter allows the user to sequence the UVC's operation to that equipment. This means that if that equipment is not operating, the UVC is turned off. (It does not honor its setpoints or other parameter settings.)

- Default: Inactive
- Range: Active or Inactive

The executive module controlling the UVC determines how sequencing is accomplished. For example, for an EC, if the user selects **Active** for the Network Sequence parameter, three options are offered:

- Selecting **Loads** sequences the UVC's operation to loads that the user selects from the Load Directory screen. After making the load selections, the user must press **enter** to return to the Control Settings and Parameters screen. ESS32 automatically highlights the **Network Sequence Status** parameter for the user to select additional options that apply to this sequence.
- Selecting **Virtual** sequences the UVC's operation to the systems virtual points at the Virtual Points Directory screen. After making the point selections, the user must press **enter** to return to the Control Settings and Parameters screen.
- Selecting **Global** sequences the UVC's operation to global outputs on other executive modules in a NovarNet[®] system. Making this selection opens the Unit Directory screen. Selecting another (or the same) executive module opens that module's Load Directory screen.

Each time a unitary controller load is selected, a screen opens so the user can choose cooling, heating, and/or fan sequence.

NovarNet systems can have 128 global output sequences for each executive module. For each unitary controller sequenced, the user can choose any or all of the cooling, heating, and fan sequence operations. If all three are chosen, it counts as 3 sequences out of the possible 128. This is an important consideration to remember when programming these parameters.

Network Sequence Status

This parameter defines the network sequencing to **Any** or **All** of the specified loads, points, or outputs, based on their on or off state. Also, if unitary controller loads were sequenced, the user can choose **Heat**, **Cool**, or **Heat/Cool** sequence states.

Default: Inactive
Range: Active or Inactive

The **Network Sequence** parameter must be active before this parameter can be changed.

Zone Sensor Failure Control Mode

This parameter determines the control mode (off, cool, or heat) to which the UVC reverts in the event that the zone temperature sensor connected to it fails.

- Default: Off
- Range: Off, Cool, or Heat

If **Heat** or **Cool** is selected, the user can indicate a percentage of heating or cooling from 0% to 100% (pertains to modulating outputs only).

Air Flow Input

This parameter determines how the UVC reacts to a contact closure on its airflow input.

- Default: Inactive
- Range: Active or Inactive

Selecting **active** causes the UVC to search for a contact closure on its airflow input 1 minute after calling for the fan. If one is not found, it sends out an alarm.

Force Outputs to Emergency States

This parameter determines whether the relay outputs are forced off (open) and the modulating outputs are forced to their defined emergency states when an air flow alarm occurs.

- Default: No
 - Range: Yes (they are forced off) or No
-

Timed Override Period

This parameter determines how long a timed override lasts.

- Default: Inactive (0 hours, 0 minutes)
- Range: 0–4 hours, 0–59 minutes

NOTE! Setting the range to 4 hours, 14 minutes creates a continuous override that lasts until the next scheduled off period.

The UVC controls to scheduled on setpoints when the override button is pushed. This scheduled override may be canceled by pushing the button again.

After entering the timed override period, the following request appears:

“Timed override FORCED FROM ESS? (Y or N):”

A forced override can be initiated during the scheduled on time and can keep the load scheduled on. It clears at the beginning of the next regularly scheduled on time (usually the next morning).

Module Type

This parameter opens a popup screen listing the UVC type selected when the load was created and the correct output configuration for that type. The information in this screen cannot be changed.

Discharge Hi Limit

This parameter defines a high temperature limit used to control discharge air (heating mode only). If the discharge temperature exceeds this setting, the heating output modulates (analog) or cycles (digital) to maintain it as long as the zone is calling for heat.

- Default: 144°F
 - Range: 20°F–144°F
-

Discharge Low Temp Alarm (UVC-10 and UVC-11)

This parameter defines a low temperature limit between 1°F and 255°F for discharge air. If the discharge air temperature goes below this limit, an alarm is activated.

Default: 0°F (Inactive)
Range: 1°F–255°F

Selecting **0** deactivates the alarm feature.

UVC Monitoring

Monitoring Functions Screen

The parameters and values displayed on the UVC Monitoring Functions screen (Figure 3) vary, depending on the UVC load type specified when the load was created.

LOAD: 33 a uv module	SYSTEM: 141 Tom's EP/2 3.70
TYPE: UNIT VENTILATOR	EP: 1 The NEW EP/2
MONITORING FUNCTIONS	MODULE: 002 a uv module
18	
Zone temperature:	78°F
Discharge air temp:	78°F
Control setpoint: c	58°F
Cool setback:	58°F
Heat setback:	55°F
Demand setback:	0°F
Active stages:	COOL 1
	HEAT: 0.00 volts
Fan status:	ON
Damper:	0.00 volts
Schedule mode:	OFF
Off mode activated by:	SCHEDULE
Override remaining:	0 MINUTES
OSA Temp:	85°F Sys Humidity: INACTIVE
Press a T to start the TIMED OVERRIDE	
	TAB FOR RUN-TIME

Figure 3. UVC Monitoring Functions screen

The prompt line at the bottom of the screen displays instructions for initiating timed overrides, forcing overrides, or canceling an override, depending on the module's current schedule status. The following table explains the options.

OVERRIDE FUNCTION	EXPLANATION
Initiate a timed override	<p>If the module is in scheduled off mode, typing the letter T (timed override) at the prompt initiates a timed override.</p> <hr/> <p>NOTE! When a timed override is initiated from the monitoring screen, the LED located on the front of the UVC does not flash as it would if the user initiated the override at the UVC. The module communications LED does continue to flash normally.)</p> <hr/>
Force an override	<p>Typing the letter F (force) at the prompt forces the module to remain on if it is scheduled to turn off.</p> <p>This override automatically terminates when the UVC returns to the scheduled on mode.</p>
Cancel a timed override	<p>Typing the letter C (cancel) at the prompt cancels a timed override.</p>
Cancel a forced override	<p>Typing the letter Q (quit) at the prompt cancels a forced override.</p>

NOTE! It is not necessary to press **enter** after pressing the override function keys.

As indicated in the lower right corner of the screen, if the user presses the **tab** key, the system displays the run times (in hours) since the end of the last maintenance interval.

The Monitoring Functions screen lists the following parameters and their current values. If a field's parameter has been modified by a "temporary user" or with "temporary setpoints," the word "***LOCAL**" appears next to it.

Parameter Values

Zone Temperature

This field shows the current temperature detected by the temperature sensor located in the UVC's zone.

Discharge Air Temp

This field shows the current temperature of the UVC's discharge air.

Control Setpoint

This field shows the current controlling setpoint value based on the zone temperature, heating/cooling condition, schedule status, and demand status.

A potentiometer on the zone temperature sensor can be used to adjust the setpoint to allow it to vary as much as 3 degrees above or below the actual heating or cooling setpoint.

Cool Setpoint, Cool Setback, Heat Setpoint, Heat Setback

These fields show the programmed setpoint values for the desired operating conditions.

The display changes from setpoint to setback based on the on/off schedule. Setpoints are shown when the UVC is in an override or time-of-day schedule mode. The setback temperature is shown during an unoccupied period when the UVC is scheduled off.

Demand Setback

This field shows the number of degrees the setpoint is to be adjusted to reduce energy consumption during a peak demand period.

Active Stages

This field shows the current status of the heating, cooling, and damper outputs.

A *Zero Energy Band* message means the zone temperature is within the comfort range (neither heating nor cooling is required).

Any analog output is displayed as a voltage reading. Digital outputs are displayed if they are on. If network sequences are not met, "Sequence Inhibit" appears next to this parameter.

Fan Status

This field shows the fan output status as on, off, or auto.

Damper

This field shows the status or position of the damper as an analog value.

Schedule Mode

This field shows the UVC's current schedule status as on or off. The status can be changed by any of the following items:

- Time-of-day schedule
 - Optimized start/stop
 - Timed override
 - Other schedule events
-

On/Off Mode Activated By

This field shows whether the UVC's on or off status was activated by its schedule or by a timed override.

Override Remaining

This field shows the number of minutes remaining in an activated timed override period.

OSA Temp

This field shows the current outside air temperature as received from the executive module.

UVC Alarms and Faults

When an alarm or fault occurs, one of the following messages appears in the lower section of the screen.

MESSAGE	EXPLANATION
Emergency Status	<p>The unit's operation is forced off due to a system-wide emergency condition. The following items are examples of such conditions:</p> <ul style="list-style-type: none"> ■ Site emergency ■ Phase loss ■ A monitoring alarm point defined in the software
Temperature Drift Limit Alarm	The zone temperature (heating or cooling) is 3 degrees beyond the setpoint and is not approaching the setpoint at a rate faster than 0.5 degrees per 10-minute interval.
Zone Temperature Sensor Fault	<p>The UVC's self-test routine indicates that the space sensor has failed (opened or shorted).</p> <p style="text-align: right;"><i>continued</i></p>

MESSAGE	EXPLANATION
Airflow Alarm	The fan output is active but the UVC's airflow input, which is always active, does not detect airflow. All outputs are forced off when this alarm occurs.
Mod Comm Loss Fault	The UVC is not communicating with the executive module.
Phase Loss Alarm	A phase loss has been detected at the executive module or monitoring input point. Staged heat and the fan go off. The positioners remain in place when this alarm occurs.

The message is displayed until the fault condition clears.

The following table explains the options available to the user when an alarm message appears.

FUNCTION	EXPLANATION
Acknowledge an Alarm	Type the letter A at the prompt to acknowledge an alarm. The system logs the time, date, and user who acknowledged the alarm at the executive module. It does not clear the alarm.
Reset an Airflow Alarm Condition	(Airflow alarms only) Type the letter R at the prompt to reset the airflow alarm. The reset takes about 1 minute.
Inhibit an Alarm	Type the letter I at the prompt to inhibit or keep the alarm from being displayed at the executive module.

NOTE! It is not necessary to press **enter** after pressing the alarm function keys.
