



VAV-4020 Programming and Monitoring Instructions

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Novar; 6060 Rockside Woods Blvd., Cleveland, OH 44131
Tel.: 800.348.1235 www.novar.com

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Description

Novar's Variable Air Volume controller (VAV-4020) is a fully digital control device that provides closed-loop control of modulating variable air volume systems or modulating heating/cooling boxes. The VAV-4020 contains an on-board airflow sensor for pressure-independent variable air volume control. Setpoints, airflow settings, reheat, and fan control allow it to be used in variable air volume, variable volume and temperature, and other modulating airflow applications.

Programming Overview

To set or change the VAV-4020's parameters, a user must access the ESS32 Function Menu (Figure 1) and select the **Load Control** option to access the Load Directory screen.

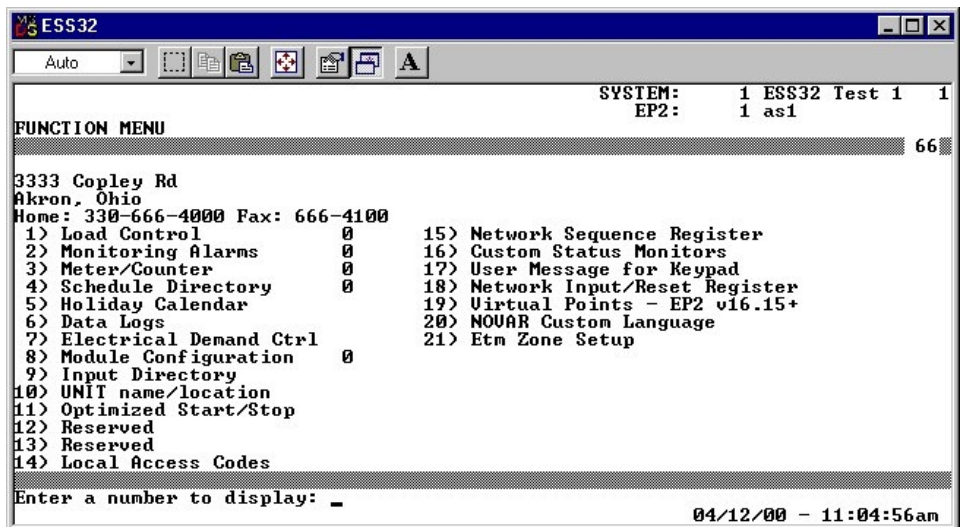


Figure 1. ESS32 Function Menu

The Load Directory screen can be used to:

- Create a new VAV-4020 load.
- Access a load's Menu screen and Control Settings/Parameters screen to set or modify its parameters.

Creating a VAV-4020 Load

The following procedure should be used to create a new VAV-4020 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 menu.
3	Use the keyboard arrow keys to move the cursor to and highlight the VAV option and press enter .

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

Modifying/Setting a VAV-4020'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 for that load.
- Select the **Control Settings and Parameters** option and press **enter**.

Figure 2 shows the Control Settings/Parameters screen for a VAV-4020 load. The message "Tab 1 of 3" in the lower right corner of the screen indicates that the list of parameters takes up three screens. The user can press **tab** to display the parameters listed on the next screen.

```

ESS32
Auto
LOAD: 3 UAU Load #3          SYSTEM: 1 ESS32 Test 1 1
TYPE: UAU                   EP2: 1 as1
CONTROL SETTINGS/PARAMETERS  MODULE: 002 UAU Load #3
1) Program operating mode:   RUN
2) Cool setpoint:           74 F
3) Heat setpoint:           70 F
4) Cool setback:            85 F
5) Heat setback:            60 F
6) Setpoint adjust mode:    INACTIVE
  Schedule ON
7) Cooling - min air flow:   200 CFM
8)   - max air flow:        800 CFM
9) Heating - min air flow:   200 CFM
10)  - max air flow:        800 CFM
11) Schedule ON fan mode:   FIRST STAGE HEAT
  Schedule OFF
12) Cooling - min air flow:  200 CFM
13)   - max air flow:       800 CFM
14) Heating - min air flow:  200 CFM
15)   - max air flow:       800 CFM
16) Schedule OFF fan mode:  FIRST STAGE HEAT
Enter a number to modify: _
                                04/19/00 - 02:01:32pm
    
```

Figure 2. VAV Control Settings/Parameters 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**.

VAV-4020 Control Settings and Parameters

An explanation of the VAV-4020 parameters and the options offered for each follows.

Program Operating Mode

This parameter establishes the load's operating mode.

- Default: Run
- Range: Run or Standby

Selecting **Run** causes the controller to operate normally.

Selecting **Standby** turns off heating outputs. Modulating heating/cooling outputs remain in their current positions.

Cool Setpoint

This parameter specifies a scheduled on cool setpoint temperature.

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

Heat Setpoint

This parameter specifies a scheduled on heating setpoint temperature.

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

Cool Setback

This parameter specifies a scheduled off cool setpoint temperature.

- Default: 85°F
 - Range: One degree above the Heat Setback value up to a maximum of 127°F
-

Heat Setback

This parameter specifies a scheduled off heating setpoint temperature.

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

Setpoint Adjust Mode

This parameter enables local heating and cooling setpoint adjustments.

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

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

Selecting **Active—Always** activates the setpoint adjust mode auxiliary input during the scheduled on times.

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.

Scheduled On Airflow Parameters

The following parameters are used to configure the minimum and maximum cooling and heating setpoints during scheduled on conditions.

NOTE! Before defining these parameters, the user must configure the VAV-4020's Airflow Scaling Factor and Maximum Airflow Range (Parameters #17 and #18, explained later in this document).

The airflow sensor is rated at a minimum velocity pressure of 0.01 inches of water column. A cfm setpoint that drops below this point will result in the module being unable to control the airflow properly. The user should refer to the cfm vs. Velocity Pressure (also referred to as Delta-P) supplied with the variable air volume box.

Cooling Minimum Airflow

This setpoint establishes minimum cooling airflow rates in cubic feet per minute (cfm).

- Default: 200 cfm
- Range: 0 to the maximum cfm value set in Parameter #18.

If the minimum cfm is a value other than zero, never enter a minimum cfm setpoint that is less than 10% of the number entered in the scaling factor (#17 on the Control Settings/Parameters screen).

Cooling Maximum Airflow

This setpoint establishes the maximum cooling airflow rates in cfm

- Default: 800 cfm
- Range: 0 to the maximum cfm value set in Parameter #18.

If the minimum cfm is a value other than zero, never enter a minimum cfm setpoint that is less than 10% of the number entered in the scaling factor (#17 on the Control Settings/Parameters screen).

Heating Minimum Airflow

This setpoint establishes minimum airflow rate in cfm when in the VAV heating mode. The box will maintain the heating minimum cfm that is specified. The reheat value (or heating stages) will then modulate to maintain space temperature.

- Default: 800 cfm
- Range: 0 to the maximum cfm value set in Parameter #18.

NOTE! The cooling output will control the damper to maintain this value when the module is in the heating mode.

Heating Maximum Airflow

This setpoint establishes the maximum heating airflow rates in cfm. A difference of at least 10% should be maintained between the heating minimum and heating maximum cfm.

- Default: 800 cfm
- Range: 0 to the maximum cfm value set in Parameter #18.

The maximum heating airflow is used in two ways:

- In VVT mode, it will control the damper as needed to reach the maximum value.
 - In VAV mode, an analog output will modulate closed if the cfm exceeds this maximum cfm value. A digital output will turn off if the cfm value is exceeded.
-

Schedule on Fan Mode

This parameter sets the module's fan output operation mode in the VAV-4020 mode only:

- Default: First Stage Heat
- Range: Inactive, Continuous, Airflow Setpoint, or First Stage Heat

The range options operate as follows.

OPTION	EXPLANATION
Inactive	Deactivates the fan output in both heating and cooling modes.
Continuous	Causes the fan output to be energized continuously.
Airflow Setpoint	Causes the fan output to be energized below a specified cfm setpoint.
First Stage Heat	Causes the fan output to be energized at and below the heating temperature setpoint.

Operation of Heating Stages and Reheat Fan

- Staged Heat - No Fan

The first stage of reheat has its setpoint differential split half above and half below the heating setpoint. The second stage of reheat has its differential completely below the heating setpoint.

- Staged Heat with Fan Defined as First Stage Heat

The fan stage of reheat uses the H1 DIFF. The differential for the fan is 0.2 degrees below and 0.2 degrees above the heating setpoint. The second stage of the reheat differential is completely below the heating setpoint.

- Modulating Reheat with No Fan

There is no defined setpoint differential involved.

- Modulating Reheat with Fan Defined as First Stage Heat

The fan turns on at the heating setpoint and off at 0.6 degrees above the heating setpoint. The modulating reheat becomes activated at 0.4 degrees below the heating setpoint. After it becomes active, it modulates to maintain the heating setpoint as closely as possible.

Scheduled Off cfm Parameters

The following parameters are used to configure the minimum and maximum cooling and heating setpoints during scheduled off conditions.

The airflow sensor cannot operate to maintain cfm setpoints if the main air-handling unit that supplies air to the variable air volume box shuts down. If the position of the damper is critical under these conditions, the VAV-4020 module should be sequenced to the air handler using network sequence with the sequence off positioned as desired.

Cooling Minimum Airflow

This parameter establishes the minimum cooling airflow rate in cfm.

- Default: 200 cfm
- Range: 0 to the maximum cfm value set in Parameter #18.

If the minimum cfm is a value other than zero, never enter a minimum cfm setpoint that is less than 10% of the number entered in the scaling factor (#17 on the Control Settings/Parameters screen).

Cooling Maximum Airflow

This parameter establishes the maximum cooling airflow rate in cfm.

- Default: 800 cfm
 - Range: 0 to the maximum cfm value set in Parameter #18.
-

Heating Minimum Airflow

This parameter establishes the heating airflow rate in cfm. A difference of at least 10% should be maintained between the heating minimum and heating maximum cfm setpoints.

- Default: 200 cfm
- Range: 0 to the maximum cfm value set in Parameter #18.

During scheduled off time, in the heat mode, the damper will stay fully closed until it reaches the heat setback temperature. At that point, it will go to the heat minimum cfm.

Heating Maximum Airflow

This parameter establishes the maximum heating airflow rate in cfm.

- Default: 800 cfm
- Range: 0 to the maximum cfm value set in Parameter #18.

The maximum heating airflow is used in two ways:

- In VVT mode, it controls the damper as needed to reach this maximum value.
- In VAV mode, it will close the heating output if the value is reached.

A difference of at least 10% should be maintained between the heating minimum and heating maximum cfm setpoints.

Schedule Off Fan Mode

This parameter sets the module's fan output operation mode in the VAV mode only:

- Default: First Stage Heat
- Range: Inactive, Continuous, Airflow Setpoint, or First Stage Heat

The range options operate as follows.

OPTION	EXPLANATION
Inactive	Deactivates the fan output in all modes.
Continuous	Causes the fan output to be energized continuously.
Airflow Setpoint	Causes the fan output to be energized below a specified cfm setpoint.
First Stage Heat	Causes the fan output to be energized at and below the heating temperature setpoint.

Airflow Scaling Factor

This parameter sets a velocity pressure (Delta-P) scaling factor for the airflow sensor to calculate the proper cfm for a VAV-4020 module.

- Default: 1000
- Range: 0–8191

Refer to the chart supplied with the VAV box (typically mounted on the side of the box). If 1 inch of velocity pressure (V_p) is shown on the chart, the rated cfm at one inch should be used as the scaling factor. If 1 inch of velocity pressure is not shown on the chart, the cfm at 1 inch of velocity pressure should be calculated using the following formula and entered as the scaling factor.

$$\text{Scaling Factor} = \text{cfm} \div \ddot{O}V_p$$

Calibrating the Scaling Factor

If the calculated cfm value displayed on the ESS32 monitoring screen does not match the job site measured cfm value, the scaling factor can be automatically rescaled by entering the ESS32 measured value on the monitoring screen and the cfm value measured at the job site. The new scaling factor is updated and entered as the control value.

Maximum Air Flow Range

This parameter establishes the maximum cfm airflow range for the VAV-4020 (normally the maximum cfm at which the variable air volume box is rated) and defines the control resolution of the cfm setpoints. Based on this number, ESS32 selects one of the predefined ranges into which the variable air volume fits.

- Default: 1020 cfm
 - Range: 1–7905 cfm
-

Active Heat Mode?

This parameter enables or disables heating for variable air volume applications.

- Default: Yes
- Range: Yes or No

Selecting **Yes** enables the heating. Selecting **No** causes the heating outputs to remain inactive. For VVT applications, the heating outputs are disabled.

Modulating or Staged

This parameter is a subset of the Active Heat Mode parameter. It selects the heating control type.

- Default: Staged
- Range: Staged or Modulated

Selecting **Staged** gives two stages of control. The user is prompted to enter a temperature differential for H1 and H2 between 0°F and 7.5°F or 0 for inactive. The **enter** key must be pressed to confirm each value entered.

Selecting **Modulating** converts the H1 and H2 outputs to a tri-state mode to control a modulating valve (or damper). The user is prompted to enter an actuator opening and closing time between 0 and 8 minutes, 30 seconds. The **enter** key must be pressed to confirm each value entered.

VVT

This parameter activates or deactivates a variable volume and temperature control scheme typically used to retrofit a single zone rooftop unit into a multi-zone temperature control system. The rooftop unit must have zone dampers installed. A VAV-4020 can be used to control these dampers.

- Default: No
- Range: Yes or No

Selecting **Yes** changes the action of the damper outputs from a cooling actuator to a heating actuator when in heat mode.

If VVT is active, the Active Heat Mode parameter is set to modulating reheat. The opening/closing times specified for the heating actuator are used for the modulation of the VVT zone damper. The actual heat output points are not functional on the VAV-4020 module.

If VVT is active, the user must define a load in the system at the **Network Sequence/VVT Mode Point** parameter that causes the damper to reverse its action. When that load is off, the damper acts as a cooling actuator. When the load is on, the damper acts as a heating actuator. Typically, this load is Heating Stage 1 of the associated Rooftop Unit.

Warmup Setpoint Adjust

This parameter activates morning warmup when an offset temperature from the scheduled on setpoint is entered.

- Default: Setpoint Adjust
- Range: Setpoint Adjust or Inactive

Selecting **Setpoint Adjust** provides the user with an offset temperature range from -7°F to 7°F . Selecting **Inactive** inactivates the parameter.

When the space temperature approaches the occupied setpoint within the offset amount, the warmup cycle is terminated. The Warmup cycle is only used from the first scheduled off-to-on cycle of each day. This feature modifies the action of the damper (for example, cool opening is viewed on the monitoring screen). The heating control continues to operate in its normal heating mode.

Example

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

Then: Warmup control point = 66°F ($70^{\circ}\text{F} + [-4]$).

The VAV-4020 incorporates a warmup cycle, a function used in the heating season to reduce the run time of the main air-handling unit by heating up the space as quickly as possible during a schedule transition from unoccupied to occupied. If the warmup cycle is active, the damper is forced to a user-defined position (usually open). It allows the heat in the main air handler or the terminal reheat to work as effectively as possible. The warmup cycle mode continues until the maximum warmup time is reached or the space temperature approaches the occupied setpoint within a defined number of degrees.

Warmup Timeout

This parameter establishes the maximum period for the warmup cycle.

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

Morning Warmup Damper Position

This parameter defines the damper position that occurs when the morning warmup cycle is in effect.

- Default: Minimum
 - Range: Minimum or Maximum (refers to the cfm minimum or maximum value as defined in the Scheduled On Cool cfm parameters)
-

Demand Control

This parameter activates or inactivates the demand control mode.

- Default: Inactive
- Range: Active or Inactive

Selecting **Active** causes the VAV-4020 to adjust setpoint on shed command from the executive module. Load shedding is subject to the constraints of the control settings and parameters.

Selecting **Inactive** causes the VAV-4020 not to be shed on command from the executive module.

Demand Active in Cool Mode

This parameter determines whether the demand is active in cool mode.

- Default: No
- Range: Yes or No

Selecting **Yes** permits the demand control to follow the cooling mode parameters established in the **Demand Setpoint Adjust** parameter.

Selecting **No** prevents demand control from having any effect in the cooling mode.

Demand Active in Heat Mode

This parameter determines whether the demand is active in the heat mode.

- Default: No
- Range: Yes or No

Selecting **Yes** causes demand control to follow the parameters established in the **Demand Setpoint Adjust** parameter.

Selecting **No** prevents demand control from having any effect on heating mode.

Demand Setpoint Adjust

This parameter specifies the number of degrees that the setpoint is shifted when this load is shed by the demand control program. The cooling setpoint is shifted up and the heating setpoint is shifted down.

- Default: 0°F
 - Range: 0°F–9°F
-

Optimized Start/Stop

This parameter sets the method by which optimized start and stop routines operate.

- Default: Inactive
- Range: Active or Inactive

Selecting **Active** causes the start time to advance in accordance with the optimized start routine. Selecting a value of 1 for the Stop value will permit optimized start with no optimized stop. Selecting a value of 2 through 30 for a stop parameter activates the optimized stop feature, permitting the zone to drift by this specified number of degrees by the scheduled off time. A primary schedule must be created before this parameter can be changed.

Selecting **Inactive** causes the load to follow the programmed schedule.

Drift Limit Alarm

This parameter activates or deactivates the drift limit alarm if the VAV-4020 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 VAV-4020 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 VAV-4020 is unable to achieve the heating or cooling setpoint. The alarm condition is not reported to ESS32.

Site Emergency Output State (and Network Emergency)

These parameters establish the load's operating parameters when a site or network emergency is detected.

- Default: Inactive
- Range: Inactive, Cool Max Airflow, Full Open, or Full Closed

The range options operate as follows.

OPTION	EXPLANATION
Inactive	Prevents the load from responding to the emergency condition.
Cool Max Airflow	Causes the output to be controlled to maintain the Cool Maximum cfm setpoint.
Full Open	Energizes the output to open the damper continuously.
Full Closed	Energizes the output to close the damper continuously.

Timed Override Period

This parameter activates or inactivates a specified time interval that determines the period of time an override period is active.

- Default: Inactive
- Range: 0 to 4 hours, 0 to 59 minutes (to a maximum of 4 hours, 13 minutes)

NOTE! An entry of 4 hours, 14 minutes, sets the timed override period to continuous. The load will operate in timed override mode until the next scheduled on time or until the timed override button is pressed again.

When this parameter is selected, the user is prompted to enter a time interval. Once the time interval is entered, the parameter is active and the VAV-4020 controls to scheduled on setpoints when the override button is pushed. This scheduled override may be canceled by pushing the button again. Override time is logged and accumulated on a monthly basis and can be viewed on the monitoring screen.

Selecting **Inactive** disables the override.

After entering the timed override period, the user is prompted to answer the following question:

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

A forced override can be initiated during the scheduled on time to keep the load on. It clears at the beginning of the next regularly scheduled on time (usually the next morning). Forcing an override from ESS32 is not the same as initiating a timed override from the load monitoring screen.

Network Sequence/VVT Mode Point

This parameter defines a sequence point for activation of the VVT function, or for using network sequence in a variable air volume application.

- Default: Inactive
- Range: Active or Inactive

Selecting **Inactive** causes the network sequence condition to be disregarded.

For VVT applications: If VVT is **Active**, the user must define a load in the system that causes the damper to reverse its action. When that load is off, the damper acts as a cooling actuator. When the load is on, the damper acts as a heating actuator. Typically, this load is Heating Stage 1 of the associated air-handling unit.

For VAV applications: Selecting **Active** sequences the operation of the VAV-4020's heating outputs to any other loads from the Load Directory screen.

For example, for an EP/2:

- Selecting **Loads** sequences the VAV-4020's operation to loads that the user selects in the Load Directory screen. When the user selects the loads and presses **enter**, ESS32 automatically highlights the **Network Sequence Status** parameter for the user to select the options that apply to this sequence.
- Selecting **Virtual** sequences the VAV-4020's operation to the system's virtual points at the Virtual Points Directory screen.
- Selecting **Global** (NovarNet[®] systems only) sequences the VAV-4020's operation to global loads on other EP/2s in a NovarNet system. When this selection is made, ESS32 opens the Unit Directory screen. Selecting another (or the same) executive module opens that executive module's Load Directory screen.

If a unitary controller load is selected, the user must also select cooling, heating, and/or fan sequences and press **enter** to advance to the next screen. If all three sequences are selected, it counts as three sequences. NovarNet systems can have 128 global output sequences for each EP/2. This is an important consideration to remember when programming these parameters.

Network Sequence Status

NOTE! The Network Sequence parameter (explained above) must be active before this parameter can be changed.

This parameter defines the network sequencing to any or all of the specified loads, points, or outputs based on their on or off states.

- Default: Inactive
- Range: Active or Inactive

If **Active** is selected, the user will be asked to select **Any** or **All** and **On** or **Off**.

The Network Sequence Status is automatically set as **VVT Active** if the VVT parameter is set to **yes**.

Sequence Off Position

This parameter determines damper operation when the Network Sequence condition is not satisfied.

- Default: Inactive
- Range: Inactive, Cool Minimum, Cool Maximum, or Full Closed

The range option operate as follows.

OPTION	EXPLANATION
Inactive	Prevents the load from responding to a network sequence.
Cool Minimum	Causes the damper to go to its scheduled on cooling minimum airflow setpoint.
Cool Maximum	Causes the damper to go to its scheduled on cooling maximum airflow setpoint.
Full Closed	Energizes the output that causes the damper to close continuously. The sequence off position is automatically set as VVT Active if the VVT parameter is set to Yes .

COMM Loss Default is used only with network sequencing. If a communication loss occurs between this module and the executive module and this parameter is set to **Inactive**, the load assumes the network sequencing parameters are satisfied and it can go into stand-alone operation. If the parameter is set to **Active**, the load assumes the network sequencing parameters are not satisfied.

Monitoring Input

This parameter activates or deactivates an input to the monitoring screen.

- Default: Inactive
- Range: Inactive or Active

Selecting **Active** allows another, user-defined input in the system to be displayed on the monitoring screen of this load. Selecting **Inactive** prevents a monitoring input from being displayed.

CFM Adjustment Factor

This parameter accurately calibrates the cfm readout under low airflow conditions. A screen displays information to assist the user with this function.

- Default: Not applicable
- Range: Not applicable

This selection should be left at zero during programming stages. If necessary, the user should make adjustments while online and monitoring the VAV-4020 operations.

The adjustment factor is used as follows. The proper scaling factor is determined as described in the **Air Flow-Scaling Factor** parameter. The scaling factor should be determined under high airflow conditions (for example, at or near the maximum cfm range specified in the **Maximum Air Flow Range** parameter). The VAV-4020 module is forced to minimum cfm and accurate test equipment is used to take an airflow reading at the VAV-4020. If the cfm readout on the ESS32 monitoring screen is inaccurate, the measured value is entered in the space marked MEASURED READING. The displayed value is entered in the space marked DISPLAYED READING. This automatically recalibrates the monitoring screen to display the correct reading. This “correction” is for display only.

Setup Mode

This parameter enables or disables manual control of the VAV-4020.

- Default: Disabled
- Range: Enabled or Disabled

Selecting **Enabled** allows the VAV-4020 to be put in Setup mode locally.

Selecting **Disabled** prevents the VAV-4020 from being put in Setup mode locally.

Refer to Novar’s *VAV-4020 Installation Instructions* (Doc. No. 560091000) for setup control procedures.

Damper Aggression Factor

This parameter provides a cfm control adjustment that determines the VAV-4020's open and close response sensitivity times.

- Default: Normal
- Range: Normal or Low

Typically, this setting will be left at **Normal** unless excessive cfm control hunting occurs at the VAV-4020

Selecting **Low** provides a cfm control adjustment that lowers the sensitivity for a variable air volume box actuator with quick open/close response times.

Disable 74°F D.A.T. Cooling Lockout

This parameter allows users to disable the 74°F discharge air temperature (supply air temperature) cooling lockout.

The VAV module will use its on-board supply air temperature sensor to prevent a zone from going into cooling when there is war air (greater than 74°F) in the duct. It keeps it at the cooling minimum cfm and prevents it from opening further.

VAV-4020 Monitoring

Figure 3 shows the VAV-4020 Monitoring Functions screen.

```

LOAD: 122 VAV - test 1                                SYSTEM: 19 NovarHQep2 X-17
TYPE: VAV                                             EP: 1 REAL LOADS & all
MONITORING FUNCTIONS                                MODULE: 024 VAV - test 1
524
Zone temperature: 76 F
Control setpoint: 75 F
Cool setpoint: 69 F
Heat setpoint: 68 F                                Heat mode NOT active
Demand setback: 0 F
Airflow: 0 CFM
Inches: 0.000
Active stages:
HEAT
CLOSING
Fan status: OFF
Schedule mode: ON
On mode activated by: SCHED
Override remaining: 0 MINUTES
OSA Temp: 49 F                                     TAB FOR RUN-TIME
    
```

Figure 3. ESS32 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 VAV-4020 does not flash as it would if the user initiated the override at the VAV-4020. (The module communications LED does continue to flash normally.)</p> <hr/>
Force an override	<p>Typing the letter F (force) at the prompt forces a load to remain on if it is scheduled to turn off.</p> <p>This override automatically terminates when the load returns to the scheduled on mode.</p>
Cancel a timed override	Typing the letter C (cancel) at the prompt cancels a timed override.
Cancel a forced override	Typing the letter Q (quit) at the prompt cancels a forced override.

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; see Figure 4) since the end of the last maintenance interval.

```
LOAD: 122 UAV - test 1          SYSTEM: 19 NovarHQep2 X-17
TYPE: UAV                      EP: 1 REAL LOADS & all
MONITORING FUNCTIONS          MODULE: 024 UAV - test 1
                               524
                               UAV VERSION: 2.4

UAV Load Run-Times since last Maintenance Interval

FAN : 0 hours
HEAT OPENING : 0 hours
HEAT CLOSING : 714 hours

Airflow scaling factor: 1000

TAB FOR MONITORING
```

Figure 4. VAV Control Settings/Parameters screen

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.

Zone Temperature

This field shows the current temperature detected by the temperature sensor located in the VAV-4020's zone.

If an additional network input has been programmed for the module, the name of the input and its value will be displayed on the screen's second line, under Zone Temperature.

Control Setpoint

This field shows the current controlling setpoint value based on the zone temperature, heating/cooling setpoints, 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 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 module is in an override or scheduled on mode. The setback temperature is shown during an unoccupied period when the module 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. This field's data also indicates if and how much demand control is changing the control setpoint.

Airflow

This field shows the calculated cubic feet per minute (cfm) airflow value at the module's location.

Inches

This field shows in inches the measured value of the airflow at the module's location.

Active Stages

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

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

For VVT control, this field also indicates if the unit is currently operating in heating or cooling mode. If network sequences are not met, "Sequence Inhibit" appears in this field.

Fan Status

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

Schedule Mode

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

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

On Mode Activated By

This field shows whether the on condition was activated by the module's schedule or by a timed override.

Override Remaining

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

OSA Temp

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

VAV Alarms and Faults

When an alarm or fault occurs, one of the following messages appears on the screen.

MESSAGE	EXPLANATION
Emergency Status	The unit's operation is forced off due to a system-wide emergency condition. The following items are examples of such conditions: <ul style="list-style-type: none"> ■ Site emergency ■ Phase loss ■ A software-defined monitoring alarm point.
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	The module's self-test routine indicates that the space sensor has failed (opened or shorted).
Mod COMM Loss Fault	The module is not communicating with the executive module.

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	Typing the letter A at the prompt acknowledges an alarm. The system logs the time, date, and user who acknowledged the alarm at the executive module. It does not clear the alarm.
Inhibit an Alarm	Typing an I at the prompt inhibits or keeps the alarm from being displayed at the executive module.

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

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