PROLON

FOCUS GUIDE

UNIT VENTILATOR

Configuration Guide for Prolon Focus Software

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REV. 7.8
PL-FOC-UNV-EN

Table of Contents

Table of Figures

1 - Prolon Unit Ventilator Controller

This guide will describe in detail the operating sequences and configuration variables used by the Prolon *Unit Ventilator controller.*

The *Unit Ventilator Controller* is designed to control a variety of 2-Pipe and 4-Pipe Unit Ventilator systems. The on-board microcontroller offers precise digital control to maximize performance. The available control sequences are fully configurable, either locally or remotely, using free software. The UNV uses PI (Proportional-Integral) control loops to optimize HVAC management and offers a variety of functions such as 2-pipe automatic mode change based on water temperature, automatic purge cycles to verify water temperature and prevent stagnation in coils, economizer, face & bypass sequences, and more.

The Prolon *Unit Ventilator controller* monitors dedicated inputs and uses pre-established control sequences that drive dedicated outputs to control standard unit ventilator equipment. The sequences offered are highly configurable, allowing for greater flexibility in the final operation of the controller.

1.1 - Hardware

The Prolon ***Unit Ventilator Controller*** is offered exclusively on the M2000 hardware platform. Please see the M2000-UNV HARDWARE GUIDE for more information:

M2000 → 9 Analog Inputs / 5 Digital Outputs / 3 Analog Outputs.

2 - Networking

Prolon's ***Unit Ventilator Controller*** can work completely independently but can also be integrated into a network with other types of Prolon controllers, where they will share and exchange information for a more effective overall system. Prolon's default method of network communication is Modbus RTU over RS485.

2.1 - Shared Information

When a ***Unit Ventilator Controller*** is networked with a Prolon Master Controller (such as a Rooftop controller), it will automatically be detected and start sharing information. Here is the list of current Prolon Master Controllers:

- Rooftop Controller (RTU)
- Heatpump Controller (HP)
- Make Up Air Controller (MUA)
- Hydronics Controller (HYD)

The Prolon Network Controller is a special case, as it acts as a link between all Master Controllers, so it will be treated in a class on its own.

The following table summarizes the information shared between ***Unit Ventilator Controller*** Controllers, Prolon Master Controllers, and the Prolon Network Controller. This information is exchanged approximately every three seconds for Master Controllers, and every ten to thirty seconds for the Network Controller. If the information stops being received, it will be declared invalid after 720 seconds.

	Automatically received from Master	Can be received from NC (Configurable)	Can send to NC (Configurable)
Outside Temperature	X	X	X
Occupancy	X	X	
Two Pipe Water Supply Temperature	X	X	X

Figure 1 - Shared Information

Note that this table applies to the most recent firmware revision of Prolon controllers and may not accurately represent all older firmware revisions.

DESCRIPTION

- **Outside Air Temperature**: The outside air temperature will automatically be shared from the Master Controller to the ***Unit Ventilator Controller***. A Network Controller can also be configured to share the outside temperature with a ***Unit Ventilator Controller*** should a Master Controller not be present. In the case where both are present, the last received outside temperature value will be used. The outside temperature is used for heating and cooling lockouts.
- **Occupancy**: The occupancy status will automatically be shared from the Master Controller to the ***Unit Ventilator Controllers***. A Network Controller can also be configured to share the occupancy status with the ***Unit Ventilator Controller*** should a Master Controller not be present. In the case where both are present, the occupancy status received from the Network Controller will take priority.

- **Two Pipe Water Supply Temperature**: The two pipe water supply temperature will automatically be shared by the Master Controller to the ***Unit Ventilator Controllers***, if available. A Network Controller can also be configured to share the two-pipe water supply temperature with a ***Unit Ventilator Controller*** should a Master Controller not be present. In the case where both are present, the last received water supply temperature value will be used. The two pipe water supply temp is used to determine Water Coil Mode in a Two Pipe system.

  Any single UNV can be the source of this temperature, which can then be collected by the Network Controller and distributed throughout the network. Other valid sources for this reading could be either the Prolon Boiler, Chiller, Fan Coil or Flexio controllers.

3 - Adding a Unit Ventilator Controller to a Focus Project

Prolon Focus is a free visualization and configuration software for all Prolon controllers. Once the ***Unit Ventilator Controller*** has been physically wired to a Prolon network, it's time to add this controller to your Focus project.

3.1 - Assigning Addresses

The Prolon ***Unit Ventilator Controller's*** address can be assigned using the physical dipswitch found on the controller directly. The address will be encoded in binary. Please see each platform's HARDWARE GUIDE for more information.

3.1.1 - Address Locking

For hardware platforms with physical addressing dipswitches such as the Unit Ventilator, be aware that Prolon Focus offers a feature that allows a user to lock the address of a controller to a specific value, regardless of what is present on the addressing dipswitch. This can protect against users mistakenly changing the addresses by playing with the wrong dipswitches, but it can also lead to confusion. Please see Address Management in the Prolon Focus User Guide for more information.

3.2 - Adding the Controller to the Screen

Once the controller has been physically wired to a Prolon network and it has an assigned address, it is time to add it to your Prolon Focus project screen.

3.2.1 - Master Get List

If the ***Unit Ventilator Controller*** is placed under a Master Controller in the network hierarchy, it can be added to your screen simply by performing a GET LIST on the Master. The Master Controller will take charge and scan its network for controllers, and all those that are found will automatically be added to the screen. To perform a GET LIST, right-click on your Master icon and select "Get List":

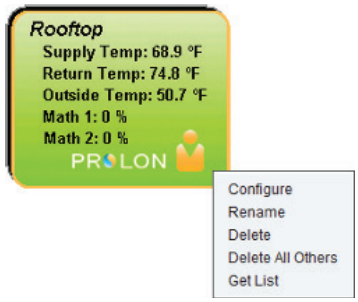

Figure 2 - Master Get List

Note that this step is crucial, as no communication will reach your UNV Controller if it has not been added to the Master's List. If no Master controller is assigned to the ***Unit Ventilator Controller***, then this step can be ignored, and the new ***Unit Ventilator Controller*** button can be used instead (see below).

3.2.2 - New Unit Ventilator Controller Button

In the event where there is no Master Controller assigned to the ***Unit Ventilator Controller*** in the network hierarchy, then a ***Unit Ventilator Controller*** can be simply added onto the screen by clicking on the "Unit Ventilator" button, found in the Devices Drag and Drop list on the left side of the Focus screen (System View only):

Figure 3 - "New Unit Ventilator" Button

Focus will ask for the address of the controller, attempt to locate it, and add it on the screen if successful.

4 - Unit Ventilator Controller Icon

Each ***Unit Ventilator Controller*** added to your system has its own icon. Each icon displays data about the ***Unit Ventilator Controller*** device it represents, and this data is updated regularly. You can open the configuration screen for a ***Unit Ventilator Controller*** by double-clicking on its icon. If the ***Unit Ventilator Controller*** is offline, all data values will show "N/A" (Not Applicable).

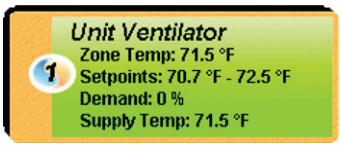

Figure 4 - Typical Unit Ventilator Controller

4.1 - Icon Data

- **Title**: The name of the ***Unit Ventilator Controller***. You can change it by right clicking the icon and choosing Rename. By default, it is set to " Unit Ventilator".
- **Address number**: This can be seen in the blue and orange circle (yin/yang) at the left side of the icon.
- **Temperature**: The current zone air temperature. Will display “N/A” if there is no temperature sensor attached or if offline.
- **Setpoints**: The active heating and cooling setpoints, respectively. Will display “N/A” if offline.
- **Demand**: The ***Unit Ventilator*** continuously calculates the demand for its zone. This demand takes the form of a number varying from -100% to +100%, where a negative percentage indicates a cooling demand, and a positive number indicates a heating demand. A demand of zero indicates that the controller is within its zone temperature setpoints and is satisfied. Will display “N/A” if the ***Unit Ventilator*** is offline.
- **Supply Temp**: The actual air temperature in the supply duct. Will display “N/A” (not applicable) if no supply temperature sensor is attached.

4.2 - Icon Colors

The icons also change color depending on the ***Unit Ventilator*** state.

- **Grey**: The icon is grey when working offline or if the communication with that ***Unit Ventilator Controller*** is lost. All data will be seen as "N/A".
- **Green**: The icon is green when the controller is communicating, but all ***Unit Ventilator*** heating or cooling actions are currently off.
- **Blue**: The icon turns blue when the ***Unit Ventilator*** cooling action is ON and stays blue until the cooling action is OFF.
- **Red**: The icon turns red when the ***Unit Ventilator*** heating action is ON and stays red until the heating action is OFF.

Figure 5 - Grey Icon

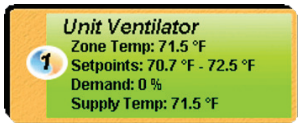

Figure 6 - Green Icon

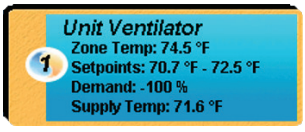

Figure 7 - Blue Icon

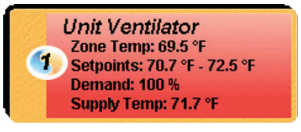

Figure 8 - Red Icon

4.3 - Icon Right Click

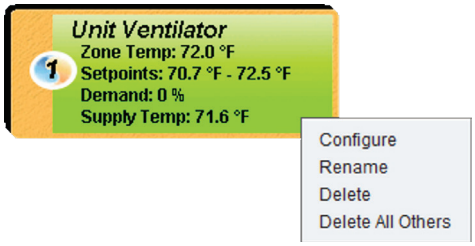

Figure 9 - Icon Right-Click for Unit Ventilator

- **Configure**: Opens the configuration screen for this ***Unit Ventilator Controller***.
- **Rename**: Allows you to rename this ***Unit Ventilator Controller***. Names are limited to 16 characters.
- **Delete**: Removes this ***Unit Ventilator Controller*** from your Focus Project.
- **Delete All Others**: Removes all other icons from the current system. This is useful for debugging purposes, for example when trying to exclusively establish communication with this controller, and the presence of the other controllers in your project is causing communications to slow down.

5 - Configuration of a Unit Ventilator Controller

To view the configuration of a ***Unit Ventilator Controller*** in detail, double-click on its icon to see its configuration screen. Use the menus in the top left corner to navigate between the different sections, or simply double-click any item in the ***Unit Ventilator Controller*** Home Screen to transfer you to its corresponding page. ***(For more details, see Section 5.1.4 - Icon Quick Jumps)***

5.1 - Unit Ventilator Controller Home Screen

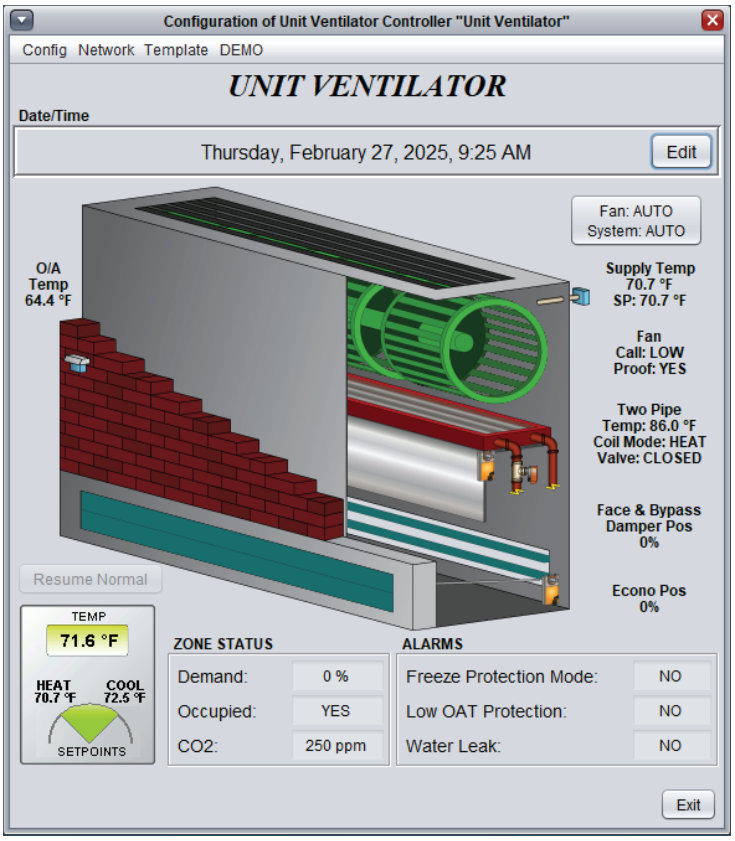

Figure 10 - Unit Ventilator Controller Hom Screen

This screen shows the status of all inputs and outputs of the ***Unit Ventilator Controller***, as well as the active setpoints. All values will be "N/A" (Not Applicable) when offline.

Note that this screen will vary greatly depending on the sequences and display choices that are selected. The following section lists all possible parameters that can be displayed on the screen, but some are mutually exclusive of others due to hardware constraints or sequence logic. The list below outlines the requirements for each element.

5.1.1 - Displayed Information – Inputs

- **Date/Time**: The current date and time from the real time clock included in the Prolon Unit Ventilator Controller. This can be edited with the Edit button. The time can be displayed in either 12h or 24h format by changing the setting in 'Time Format', under the User Profile (top right portion of the screen). NOTE: This section will be hidden if a Network Controller is feeding the Occupancy Status to the Unit Ventilator Controller.
- **O/A Temp**: The current outside air temperature. Will display "N/A" if no outside air temperature sensor is attached, or if none is provided from the network.
- **Supply Temp**: The current supply air temperature. Will be "N/A" if no sensor is attached.
- **Supply Setpoint**: The active supply air setpoint is shown under the current supply air temperature reading when applicable. It is displayed when the Economizer is actively cooling, or when the Reheat sequence is active.
- **Zone Temp & Active Setpoints**: The current zone air temperature, accompanied by the active heating and cooling setpoints are displayed on an icon of a thermostat.
- **Demand**: The zone demand as determined by the PI Controller ***detailed in section 5.3.1***.
- **Occupancy**: The occupancy status of the Unit Ventilator Controller. The occupancy state can be determined by a number of factors. They are listed here in order of priority: The occupancy status received from a Prolon Network Controller takes first priority. The occupancy status received from a Prolon Master Controller, such as a Rooftop or Heatpump is then used. Finally, the occupancy status determined by the real time clock onboard the Unit Ventilator Controller, combined with a programmed schedule will be used.
- **CO_2 Reading**: Displays the current CO_2 reading (only available if the Economizer sequence is set to Cooling + CO_2).
- **Economizer Minimum Position**: This information is displayed via TOOL TIP TEXT ONLY: Hover the mouse over the Economizer Damper Position Text and it will appear. It indicates the calculated minimum damper position, as determined in the Economizer configuration page.
- **Pipe Temp**: The current pipe temperature for both 2-pipe and 4-pipe configurations. Will display "N/A" if no pipe temperature sensor is attached. NOTE: For 2-pipe systems, if the pipe sensor becomes disconnected or invalid, the Water Coil mode (see below) will remain in its last known state until corrected. This strategy gives the occupant the best chance at remaining comfortable until seasonal maintenance occurs.
- **Change Over Contact**: The state of the contact used to indicate 2-pipe supply water temperature. Only visible in 2-pipe mode if Valve Change Over Type is set to "Contact".
- **Alarm Contact State**: Indicates the state of the Alarm Contact Input (applicable to all alarm types).
- **Water Coil Mode**: Indicates the mode of the 2-pipe water coil, determined by comparing the 2-pipe water supply temperature to the zone temperature, or simply by observing the change-over contact, as applicable. Not displayed in 4-pipe systems.
  - **HEATING**: The supply water is hotter than the zone, so heating can be provided by the water coils whenever the valve opens.
  - **COOLING**: The supply water is colder than the zone, so cooling can be provided by the water coils whenever the valve opens.
  - **NEUTRAL**: The supply water temperature is similar to the zone temperature and therefore cannot provide any heating or cooling. The valve will remain closed but can periodically run a purge cycle to clear any stagnant water and get an updated reading.
  - **INVALID**: The supply water sensor is either broken or disconnected and no reading is available.
- **Purge State**: Indicates if the UNV controller is currently running its optional purge cycle. When the purge cycle is active, a "--PURGING --" message alternates on screen along with the Water Coil Mode (see above).
- **Freeze Protection**: Indicates that the Freeze Protection sequence is active. This sequence will drive the valve to a configurable position whenever the supply air becomes too cold and the fan is stopped.
- **Low OAT Protection**: Indicates when the Low Outside Air Temperature sequence is active (exclusive to Face & Bypass setup). This sequence prevents frost buildup on the coils by opening the valve whenever the outside temperature is too low and hot water is available.

5.1.2 - Displayed Information – Outputs

- **Fan**: The status of the call for fan is displayed above a green fan icon in the middle of the screen. Accompanied by a proof of fan status (may be hidden depending on the settings). When the fan is on and there is a proof of fan signal, the icon animates by rotating the fan blades. When the fan is off or when proof of fan is missing, the fan blades are stopped.
- **Valve(s)**: The current status of the valve(s) for both 2-pipe and 4-pipe configurations. Will be displayed as either OPEN/CLOSE or in percentage, depending if the Valve is modulating or not.
- **Face & Bypass Damper Position**: The current position of the Face & Bypass Damper, expressed in percentage of opening. This will only display when the Face & Bypass Damper sequence is enabled.
- **Economizer**: The current position of the Outside Air Damper, expressed in percentage of opening. This will only display when Economizer sequence is enabled.

5.1.3 - Date/Time

The Prolon ***Unit Ventilator Controller*** has an internal real time clock. The current date and time are displayed at the top of the Home Screen. To edit the time, click on the "Edit" button.

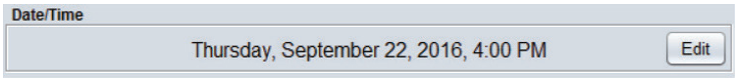

Figure 11 - Edit Time Button

A window appears allowing you to edit the time. Your computer's time is shown at the top of the window. You can copy your computer's time directly into the time of the ***Unit Ventilator Controller*** using the "Copy" button, or simply edit the time yourself by directly typing it in the corresponding text box. A drop-down list of time zones is also made available.

The use of daylight savings time can also be configured here. When set to automatic control, daylight savings will be enabled and disabled on Sunday at 2AM on the specified weeks.

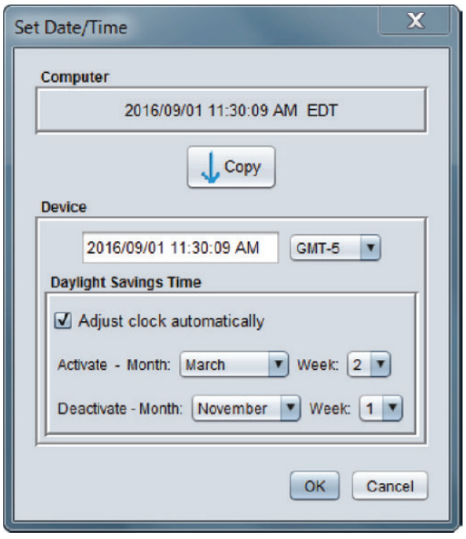

Figure 12 - Edit Time Dialog Box

5.1.4 - Icon Quick Jumps

Certain items in the Home Screen will direct you to its corresponding configuration screen when they are double-clicked. A red contour will surround the object if this feature is available.

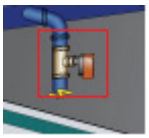

Figure 13 - Icon Quick Jump Example (Valve)

The following is a list of the featured items and their corresponding destination:

ITEMS	QUICK JUMP
Fan	Fan Configuration
Valves	Valve Configuration
Face & Bypass Damper	Face & Bypass Configuration
Economizer Motor	Economizer Configuration
Zone Temp and Setpoints	Temperature Configuration
Outside Temp	Calibration
Supply Temp	Calibration
Demand	Temperature Configuration
Occupancy	Weekly Routines
CO_2 Reading	Economizer Configuration
Alarms	Hardware Configuration

Please note that if the advanced password is enabled, you will not be able to double-click on any objects.

5.1.5 - Icon Manual Override

Certain components of the **Unit Ventilator Controller** can be overridden. To use this feature, right-click on the item of the component you wish to override. A pop-up menu will appear if this feature is available. ***Note***: Overrides are unavailable in Offline mode.

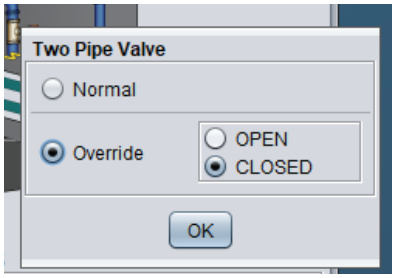

Figure 14 - Manual Override of the Valve

- **Override**: Selecting the "Override" button will allow the user to manually override the selected object until the normal mode is resumed. The following is a list of all items that can be overridden:

Fan
Valves
Fan & Bypass Damper
Economizer
Occupancy

When an override is applied to an object, a yellow contour appears around its icon and any associated text starts to flash. For example, in the figure below, the valve has been overridden.

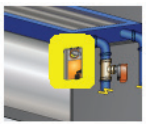

Figure 15 - Override Example - Valve

Please note that if your project HVAC access level is set to Standard, or if you are offline, you will not be able to override any objects. All overrides are cancelled when the Unit Controller Ventilator is reset or loses power.

- **Normal**: Selecting the "Normal" button will revert the selected item back to its normal automatic behavior. Any override applied to this object will be disabled.

5.1.6 - “Resume Normal” Button

This button allows the ***Unit Ventilator Controller*** to return to its fully automated behavior. All overrides previously applied to the ***Unit Ventilator Controller*** will be disabled. However, before any action is taken, a dialog box will appear to confirm your choice.

Figure 16 - "Resume Normal" Button

5.1.7 - Mode Set Button

This button allows you to manually override the operating mode of the Unit Controller. A popup will appear with the available options.

Note: Unlike most overrides, the Fan and System Operating Mode overrides configured here are stored in memory and will be kept after a power loss or reset.

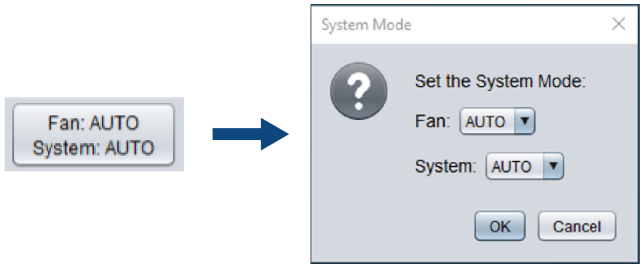

Figure 17 - Mode Set Button

- **Fan**: The Fan will activate as indicated (ON/OFF/AUTO). In Auto mode, the Fan will run as defined in the Fan Configuration Screen.
- **System**: Overrides the unit’s System Mode. ***Note*** that this does not affect operation of the Fan.
  - **AUTO**: The unit will respond to both heating and cooling calls.
  - **HEAT**: The unit will respond to heating calls only.
  - **COOL**: The unit will respond to cooling calls only. Reheating sequence and Reheat Low Limit protection are disabled.
  - **OFF**: The unit will NOT respond to either heating or cooling calls.

5.2 - Hardware Setup

This section defines the hardware setup of the ***Unit Ventilator controller*** and subsequently customizes the graphics and icons of the Home page. Some options are for display only and have no effect on the sequences running in the controller.

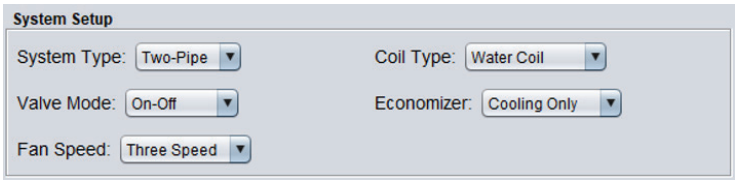

Figure 18 - System Setup

- **System Type:** Select either the Two-Pipe or Four-Pipe configuration. This choice will be primordial to the overall operation of the controller.
- **Coil Type**: Select either the Water Coil or Face & Bypass sequence. The Face & Bypass sequence is only available for Two-Pipe systems with On-Off Valve. The Face & Bypass sequence responds to heating and cooling calls by modulating a damper with an Analog Output instead of modulating a valve.
- **Valve Mode**: This determines whether Digital Outputs or Analog Outputs will be used to control the valves. Digital Outputs work in ON-OFF mode, while Analog Outputs can modulate.
- **Economizer**: This setting activates an economizer sequence with optional CO2 concentration control. An analog output will modulate the outside air damper and respond to cooling calls when the outside air is cold enough. ***See Economizer Configuration for more information.***
- **Fan Speed**: Sets the Fan to either Single Speed, Two-Speed or Three-Speed mode. ***See Fan Configuration for more details.***

5.2.1 - Analog Input 2

The ***Unit Ventilator Controller*** will dedicate an Analog Input to the Hot Water temperature sensor in a Four-Pipe system.

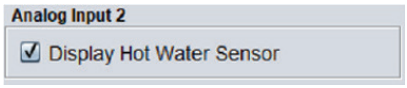

Figure 19 - AI2 - Four-Pipe Hot Water Input

Note that this reading has no effect on the sequence and is for display or datalogging purposes only. This checkbox can hide it from the Visualization page in case it is not in use.

5.2.2 - Analog Input 4

The ***Unit Ventilator Controller*** will dedicate an Analog Input to the Cold Water temperature sensor in a Four-Pipe system.

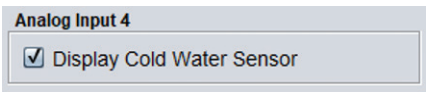

Figure 20 - AI2 - Four-Pipe Cold Water Input

Note that this reading has no effect on the sequence and is for display or datalogging purposes only. This checkbox can hide it from the Visualization page in case it is not in use.

5.2.3 - Analog Input 7

The ***Unit Ventilator Controller*** has an Analog Input dedicated to a Fan proving signal.

Figure 21 - AI7 - Fan Proof Input

The proof of fan signal is required by most sequences in the Prolon ***Unit Ventilator Controller***.

5.2.4 - Analog Input 8

The ***Unit Ventilator*** has an Analog Input dedicated to an Alarm signal. There are three alarm types.

Figure 22 - AI8 - Alarm Input

- **Water Leak Alarm**: Upon activating the alarm condition, the following equipment will be closed:
  - Valve(s)
  - Face & Bypass Damper

  The Fan or Economizer sequences are not affected by this alarm and will continue normal operation.

- **Freeze/Smoke Protection**: Upon activating this alarm, the following equipment will go to a user-configurable position ***(see section 5.5.7)***:
  - Valve (Two-Pipe setup)
  - Heating Valve (Four-Pipe setup)
  - Face & Bypass Damper

  The Cooling Valve in a Four-Pipe setup will CLOSE. In addition, the Fan will be commanded to STOP, which in turn forces the Economizer damper to CLOSE.

5.2.5 - Signal Control

Depending on the setup, the outputs may have various signal control options.

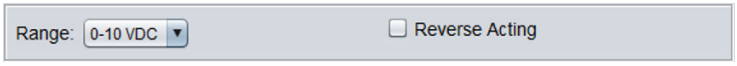

Figure 23 - Signal Control

These are:

- **Range**: Select the appropriate voltage range for the analog voltage signal (Analog Outputs only).
- **Reverse Acting**: This option reverses the electrical signal sent by the associated output. For example: 0%=10Vdc / 100% = 0Vdc for analog outputs.

5.3 - Temperature Setup

5.3.1 - PI Controller

The ***Unit Ventilator Controller*** continuously calculates the demand for its zone. This demand takes the form of a number varying from -100% to +100%, where a negative percentage indicates a cooling demand, and a positive number indicates a heating demand. A demand of zero indicates that the controller is within its zone temperature setpoints and is satisfied.

In PI loop control, as is used by the Prolon ***Unit Ventilator Controller***, the demand is calculated by adding the proportional component of the demand to the integral component. These components are determined as follows:

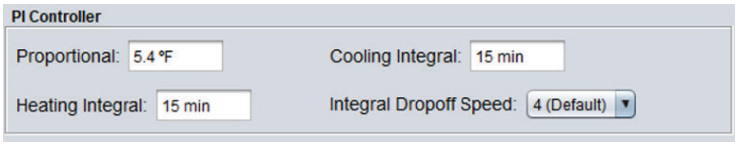

Figure 24 - Zone PI Controller

- **Proportional**: Defines the proportional band used by the ***Unit Ventilator Controller*** to calculate the proportional component of the demand. Please refer to Figure 21. Setting this value to zero removes proportional control, and consequentially, integral control. Demand will always be zero.
- **Cooling Integral**: Defines the amount of time required for the cooling integral component of the demand to equalize the proportional component. Setting this value to zero removes the cooling integral component of the demand.
- **Heating Integral**: Defines the amount of time required for the heating integral component of the demand to equalize the proportional component. Setting this value to zero removes the heating integral component of the demand.
- **Integral Dropoff Speed**: This setting defines how quickly the accumulated heating or cooling integral component of the PI calculation will be eliminated once the zone temperature returns within the setpoint deadband. The setting is provided on a scale of 1 to 5, with 1 being the slowest. Slowing down this setting can be useful in zones which have a strong constant heating or cooling load, which may make it advantageous to keep the zone demand ON even though the setpoints have been met.

5.3.2 - Setpoints

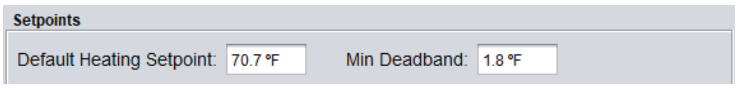

Figure 25 - Zone Setpoints

- **Default Heating Setpoint**: When there is no external source of heating setpoint, such as a connected digital or analog wall sensor, this is the value that will be used as the heating setpoint. Otherwise, it is ignored.
- **Occupied Deadband**: The deadband between the occupied heating setpoint and the occupied cooling setpoint. The cooling setpoint is calculated by adding this deadband to the heating setpoint.

5.3.3 - Setpoint Limits

These limits are applied to the default heat and cool setpoints configured above, effectively limiting the available setpoint range for this zone. This results in the final 'active' heating and cooling setpoints for occupied mode.

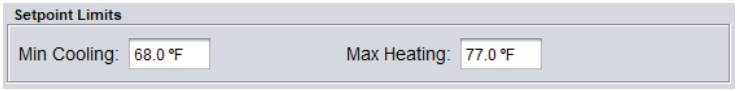

Figure 26 - Zone Setpoint Limits

If a setpoint hits its corresponding limit, the other setpoint remains offset by the Min Deadband defined above. For example, say the Default Heating Setpoint is 80 °F with a 2 °F deadband. The Default Cooling Setpoint is therefore 82 °F. Now if the Max Heating Limit is 77 °F, then the final 'active' heat setpoint is 77 °F in heat and the final 'active' cooling setpoint becomes 77+2 = 79 °F.

5.3.4 - Unoccupied Mode

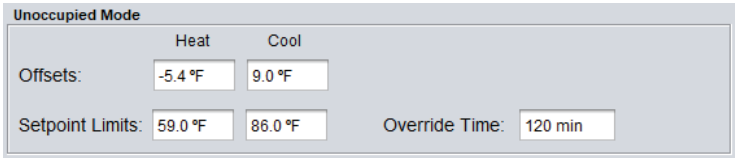

Figure 27 - Unoccupied Mode Zone Setpoints

- **Offsets**: The setpoints calculated for occupied mode (after applying the setpoint limits) are offset by these amounts during unoccupied mode.
- **Setpoint Limits**: Once the unoccupied setpoints are calculated, they are then limited by these values.
- **Override Time**: This is the amount of time spent in occupied mode once the device is overridden from unoccupied mode after activating the override sequence on the thermostat.

5.3.5 - Thermostat

These are the minimum and maximum values of the scales on the wall sensor connected to this controller. This only applies to wall sensors with scale markings, such as the T200 or PL-RS wall sensors.

Figure 28 - Thermostat Scale Limits

Changes to these are only necessary to match the scale of the connected wall sensor.

5.4 - Fan Setup

This screen is used to configure the automatic operation of the Fan, whether it be in Single, Two or Three Speed mode. Both a Call for Fan and Proof of Fan are required for most sequences to operate.

5.4.1 - Low / Single Fan Speed

This section applies equally to a Single Speed fan or to the Low Speed of a Two/Three Speed Fan. This Fan Speed is primarily occupancy-based but can also be activated on a heating or cooling call.

5.4.1.1 - Automatic Mode

You can define how the fan should operate based on three different occupancy states: Occupied, Unoccupied and Overridden. "Overridden" is defined as the state where the UNV is initially in Unoccupied mode, but then is temporarily overridden from the wall thermostat by an occupant. It is NOT related to any overrides that can be performed from the Visualization page.

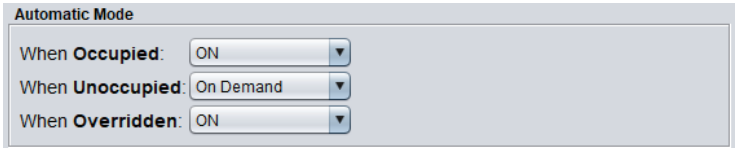

Figure 29 - Fan Automatic Mode Setup

For each occupancy state, you can configure the fan to be unconditionally ON or OFF or alternatively, to run based "On Demand".

5.4.1.2 - On Demand

In "On Demand" mode, you can define fan activation setpoints based on the zone demand. The zone demand is calculated by the controller's PI Loop ***(see Section 5.3.1)***.

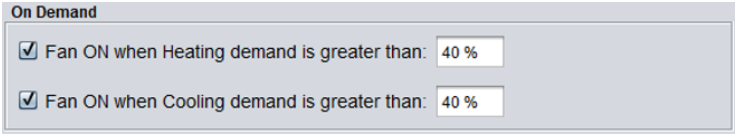

Figure 30 - Fan On Demand Mode

When the demand hits a setpoint, the Fan will start up and run at least for the Fan Minimum Ventilation Time. It will then continue until the demand drops back under the setpoint.

Note that this section is only available if at least one of the Occupancy States is set to "On Demand".

5.4.2 - Second Fan Speed

The setup for the Second Fan Speed (if applicable) differs slightly depending on whether the valves are configured for ON-OFF or modulating operation, and whether or not the Face & Bypass sequence is enabled.

5.4.2.1 - ON-OFF Valves

For ON-OFF valves, the Second Fan Speed simply activates when a valve is open and deactivates when it closes:

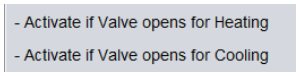

Figure 31 - Second Fan Speed with ON-OFF Valves

The only exception is when the Economizer is actively cooling. Since the valve is disabled in this case, it is instead the valve's cooling setpoint that is compared against the current cooling demand to determine whether or not the Second Fan Speed should activate.

5.4.2.2 - Modulating Valves / Face & Bypass

If the valves are set for MODULATING operation, or if the Face & Bypass sequence is enabled, the Second Fan Speed activates based on the current demand in the zone:

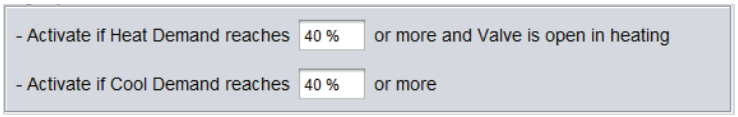

Figure 32 - Second Fan Speed with Modulating Valve/Face & Bypass

5.4.3 - Third Fan Speed

The Third Fan Speed (if applicable) activates based on the current demand in the zone.

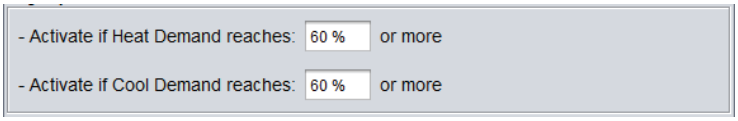

Figure 33 - Third Fan Speed Setup

Note: Fan stages are interlocked, so that any higher stage cannot activate unless the previous stage is already active.

5.4.4 - Fan Delays

This section defines the operational delays for the fan stages.

Figure 34 - Fan Delays

Minimum Ventilation Time: This defines how long the Low/Single Speed Fan stage must run after activation before it can stop. However, temperature limits and alarms take priority over this delay and can shut any active fan stages immediately.

Min On / Min Off Time: This one setting is used to define each of the following delays, applicable to all individual Fan Speeds:

- The amount of time a given Fan Speed must remain ON once activated
- The amount of time a given Fan Speed must remain OFF once deactivated
- The amount of time that must elapse after a Fan Speed is activated or deactivated before the next speed can be turned ON or OFF (interstage activation/deactivation delay)

5.5 - Valve Configuration

This screen is used to configure the operation of the Valves. The Valve operation sequence varies depending on the System and Coil Types. Both Fan Call and Fan Proof are required for the valves to open, with the exception of the Low Outside Air Protection sequence ***(see section 5.5.6)***.

- **Two Pipe Water Coil**: In this setup, an output drives a single valve that responds to both heating and cooling calls. However, the valve is only permitted to open if the Water Coil Mode is favorable to the desired action (hot water for heating, chilled water for cooling).

  If the water supply temperature is not sufficiently hot or cold, it is declared Neutral, and the valve remains closed. A periodic purge sequence may be enabled to update the Water Coil Mode ***(see Purge section)***.

  Note that if either the supply water temperature OR the zone temperature readings are invalid, then the Water Coil Mode cannot be determined, and the valves will remain closed.
- **Four Pipe Water Coil**: In this setup, two outputs each control their own valve, one for heating and another for cooling, to satisfy the zone demand. Both valves are permitted to open at any time as they are not dependent on a variable pipe temperature. (It is always assumed that the hot water valve has hot water available, and that the cold water valve has cold water available).
- **Two Pipe Face & Bypass**: In this setup, an output drives a single valve that responds to both heating and cooling calls, while another output modulates the Face & Bypass Damper. However, the valve and damper are only permitted to open if the Water Coil Mode is favorable to the desired action (hot water for heating, chilled water for cooling).

  If the water supply temperature is not sufficiently hot or cold, it is declared Neutral, and the valve and damper remain closed. A periodic purge sequence may be enabled to update the Water Coil Mode ***(see Purge section)***.

  Note that if either the supply water temperature OR the zone temperature readings are invalid, then the Water Coil Mode cannot be determined, so the valve and damper will remain closed.

5.5.1 - Setpoint

Valve response is based on the zone demand calculated by the controller's PI Loop *(see section 5.3.1)*. Separate setpoints and control bands are available for heating and cooling, and control modes will differ based on the selected Valve Type (On-Off or Modulating).

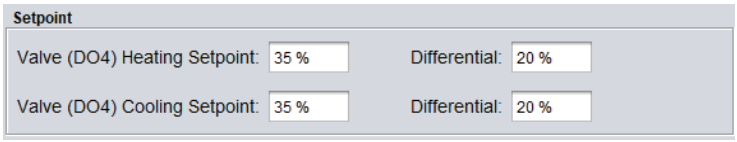

Figure 35 - Valve Setpoint Configuration

Note that if the Face & Bypass sequence is enabled, this section can instead be found in the Face & Bypass configuration page *(see section 5.6)*.

5.5.1.1 - ON-OFF Valves

On-Off valves use Differential control, with distinct activation and deactivation points based on the zone demand. These points are centered on the Setpoint and separated by the Differential Band, as shown in the following graph

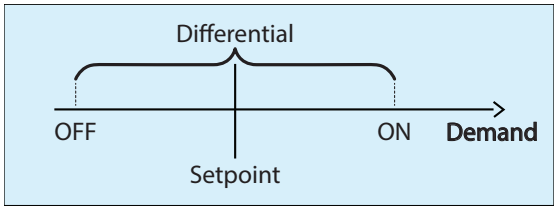

Figure 36 - Valve Differential Control

This Differential band ensures that the activation and deactivation points are sufficiently spread apart, so as to avoid short-cycling the equipment.

5.5.1.2 - Modulating Valves

Modulating valves use Proportional control, where the action increases proportionally to the zone demand. While the demand remains below the Setpoint, the valve remains closed. Once the demand ramps up past the Setpoint, the valve will open proportionally. Once the demand hits the sum of the Setpoint and Proportional band, the valve will be fully open:

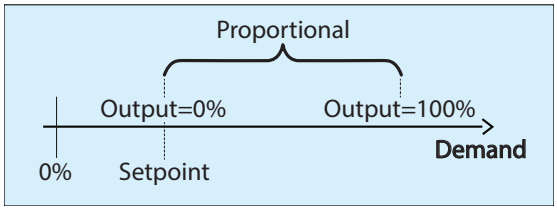

Figure 37 - Valve Proportional Band

Note that analog outputs for modulating valves use standard voltage modulation expressed over the range configured in ***section 5.2.5***.

5.5.2 - Reheating

The goal of the Reheating sequence is to maintain the designated reheat supply air setpoint. This sequence is available for modulating valves and dampers only.

Note that if the Face & Bypass sequence is enabled, this section can instead be found in the Face & Bypass configuration page ***(see section 5.6)***.

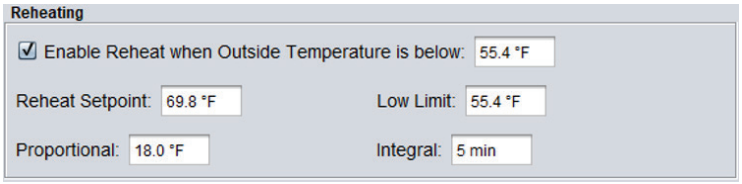

Figure 38 - Valve Reheating Configuration

Reheating is enabled when:

- The outside air temperature is below the reheat low balance point, or if the outside air temperature is invalid.
- There is a valid supply air temperature reading.
- The cooling demand is less than 10% and all cooling outputs are deactivated. If reheating does get deactivated due to a cooling demand of 10%, then the cooling demand must return to 0% before reheating will be enabled again.
- The Water Coil Mode must be in Heating (applies to Two-Pipe systems only).
- Reheating is permitted when the economizer is opening for demand-based ventilation (CO_2)

For the Reheating sequence, the value of the modulating output is calculated based on a PI (Proportional / Integral) control loop. The Proportional component of the loop is determined as follows: As the supply temperature drifts below the setpoint, the Proportional component ramps up to compensate.

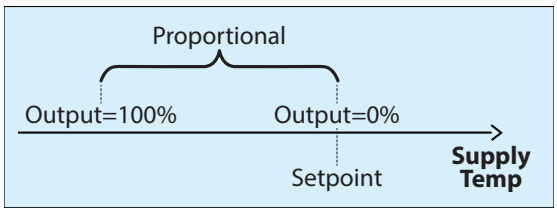

Figure 39 - Valve Reheat Proportional Loop

The Integral component is defined as the amount of time required to add 100% to the Reheat output due to a constant error of 1.8 °F (1 °C). Its purpose is to correct small errors over time.

The Proportional component is then added to the Integral component to calculate the final Reheat output. When properly tuned, this PI loop will maintain a constant supply air Setpoint in the duct.

If there is a simultaneous call for Reheat and demand-based Heat, the greater of the two resulting positions is used by the valve.

Low Limit: The Low Limit is a lower, alternate reheating setpoint which is used to maintain a safe air temperature in the supply duct during very cold winter periods. Unlike the normal reheat setpoint, it is authorized to be used even if there

is a strong cooling demand, however cooling equipment must still be deactivated first.

Essentially, it is used during winter periods where a cooling demand is present (due to strong sunlight or other reasons), and there is an outside air damper in the system. When the supply air temperature gets too low, the outside air damper will naturally close to its minimum position, but sometimes this is not sufficient to maintain safe temperatures in the supply. This is where this alternate reheat low limit comes into play to protect the building.

5.5.3 - Change Over

This section, which applies to Two-Pipe systems only, outlines the conditions which determine the Water Coil Mode. The ***Unit Ventilator Controller*** uses this information to decide whether the water supply temperature is favorable enough to respond to the zone demand. The Change Over can be based off a thermistor reading, a dry contact closure or from the Network (NC).

5.5.3.1 - Thermistor

This section defines the water supply temperature ranges that determine whether the Water Coil Mode is in HEATING, COOLING or NEUTRAL mode.

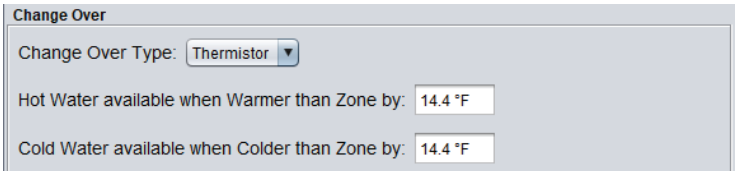

Figure 40 - Thermistor Change Over

These ranges are centered on the current zone temperature:

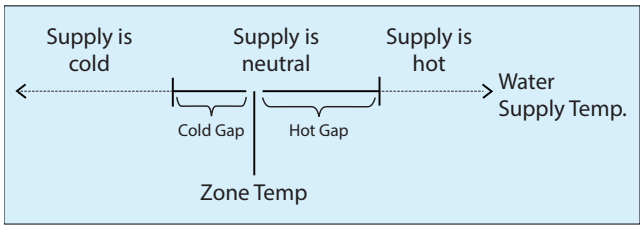

Figure 41 - Thermistor Change Over Ranges

Note that the Water Coil Mode can only become truly NEUTRAL when the water supply temperature falls within the neutral zone while the valve is open. If the water supply temperature falls within the neutral zone while the valve is closed, these neutral readings are ignored since they may simply be due to stagnant water. The Water Coil Mode will then remain in the last known state until the valve opens again.

The valve must be open for the configurable minimum delay before the supply water temperature can really be qualified as NEUTRAL:

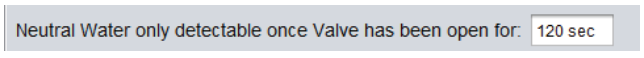

Figure 42 - Neutral Supply Water Delay

This delay ensures that any stagnant water is purged before it can influence the temperature reading. Additionally,

for Modulating valves, a minimum valve opening position is required to obtain valid supply readings. ***See "Activation Threshold" in section 5.5.5 for more details***.

If the water supply temperature suddenly becomes invalid during operation, then the Water Coil Mode will remain in the last known state until it is corrected. This strategy gives the occupant the best chance at remaining comfortable until seasonal maintenance occurs.

5.5.3.2 - Contact

This section defines how to interpret a dry contact which is being used to determine the Water Coil Mode.

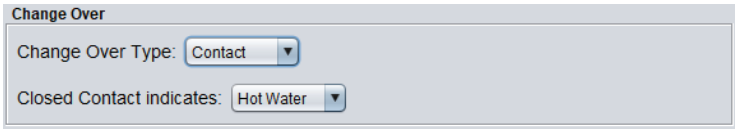

Figure 43 - Contact Change Over

You can define whether a closed contact indicates that the Water Coil Mode is in HEATING or COOLING. There is no NEUTRAL mode in this case.

5.5.4 - Purge

The Purge Cycle is intended to force the valve to open periodically whenever the Water Coil Mode is NEUTRAL. This sequence applies to Two-Pipe systems using Thermistor Change Over only. ***Note*** that the UNV Controller will not perform a purge if it is using a water supply temperature reading that has been provided by the network.

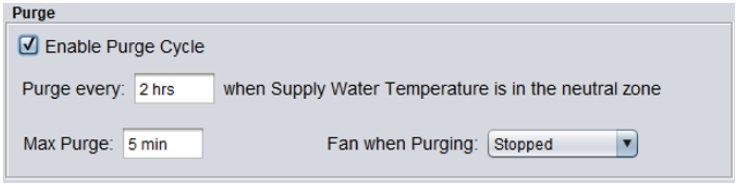

Figure 44 - Purge Sequence

When the Purge Cycle is initiated, it has a maximum delay to detect whether the water supply temperature is now considered hot or cold. If this delay expires and the Water Coil Mode is still determined to be neutral, the valve will close and await the next purge cycle. Any detection of hot or cold supply water will immediately stop the purge cycle and the Water Coil Mode will be updated.

During a purge:

- The Fan can be configured to either stop or run at the lowest speed.
- The Face & Bypass Damper will close
- Economizer is unaffected

Note that the Purge sequence will be omitted whenever the Supply Water Temperature is sourced from the Network instead of a local physical sensor.

5.5.5 - Movement Control

This section defines the restrictions placed on the valve's movement to reduce wear and to improve water supply temperature detection. This section applies to modulating valves only.

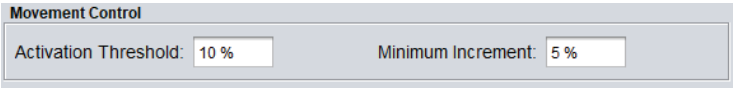

Figure 45 - Movement Control

- **Activation Threshold**: In the case of a Two-Pipe system, the valve will not begin opening until its calculated position is at least that of the Activation Threshold. It will also not be able to close to a value less than the Activation Threshold, except to go to 0%.

  This setting is used to enforce a minimum water flow during valve activity to make sure that the water does not become stagnant and induce an unreliable water supply reading. (This setting does not apply to Four-Pipe systems).

  Example: If the valve is closed and has an Activation Threshold of 10%, and its calculated position becomes 8%, it will remain closed. The valve requires a calculated position of 10% or more before it can move away from a closed position. On the other hand, when closing, the valve will never close less than 10%, unless its calculated position is 0%, at which point it will fully close.

- **Minimum Increment**: This setting applies a differential on any valve movement, to prevent wear on the valve. The valve must move by at least this amount each time, or not at all. The only exceptions are when the valve is going specifically to 0% or 100%.

5.5.6 - Low Outside Air Protection

The Low Outside Air Protection sequence (exclusive to the Face & Bypass sequence) is used to keep frost from building up on the coil. When outside air drops below a configurable setpoint and the supply water mode is in heating, the valve is commanded to open, regardless of the position of the Face & Bypass or Fan status. This circulates the hot water through the coil, preventing frost.

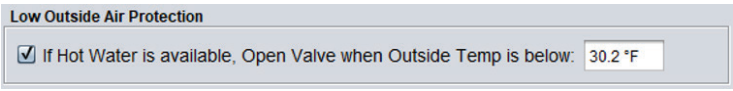

Figure 46 - Low Outside Air Protection

In this state, the Face & Bypass Damper and Economizer Damper can still modulate as needed.

Note that Alarm sequences (Water-Leak Alarm, General Alarm, Freeze Protection) all have priority over the Low Outside Air Protection sequence and will close the valve as necessary.

Note that if the outside air temperature reading is INVALID, the controller internally assumes that it is below the setpoint and will enable this protection sequence provided that hot water is available.

5.5.7 - Freeze Protection

The Freeze Protection sequence is used to prevent the pipes from freezing in the event of low air temperatures and fan failure.

Figure 47 - Freeze Protection

There are two ways of activating the Freeze Protection sequence:

1. If the Alarm Type of Analog Input 8 *(see section 5.2.4)* is set to "Freeze Protection" and the contact condition to trigger the alarm is met
2. If the following conditions are simultaneously met:
    - Call for Fan or Proof of Fan is OFF
    - Supply Air drops below the Supply Fan Cutoff limit *(see section 5.8.1)*. If the Supply Air temperature is INVALID, this condition is considered to have been met.
    - Outside Air drops below 32°F / 0°C. If the Outside Air temperature is INVALID, this condition is considered to have been met.

When the sequence is activated, the controller takes the following actions:

- Two-Pipe Valve drives to user-configurable position
- Four-Pipe Heating Valve drives to user-configurable position
- Four-Pipe Cooling Valve closes
- Face & Bypass Damper matches the valve command (go to 0% if valve is set to close, or go to 100% if valve is set to open)
- Economizer closes to 0%
- Fan Call is stopped (only when the sequence is triggered by the Contact method above)

Note that normal contact-based alarms (Water-Leak Alarm) take priority over the Freeze Protection sequence and will drive the valve closed.

5.6 - Face & Bypass Damper

This screen is used to configure the operation of the Face & Bypass Damper. In this sequence, a valve is used to allow water to pass through a coil, and a damper modulates to let the incoming air face the coil or partially bypass it.

Note that the water supply mode needs to be favorable before the valve will open and the damper will modulate. The damper and valve both require a Fan Call and Fan Proof before it can open (with the exception of the Low Outside Air Protection sequence, *see section 5.5.6*).

5.6.1 - Setpoint

Damper position is determined based on the zone demand calculated by the controller's PI Loop *(see section 5.3.1)*. Separate setpoints and proportional bands are available for heating and cooling.

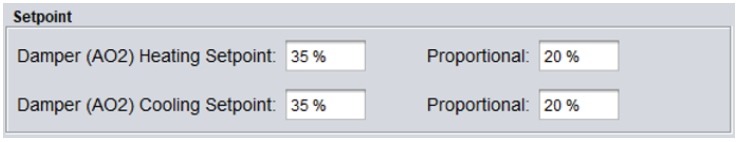

Figure 48 - Face and Bypass Setpoint Configuration

The Face & Bypass Damper uses Proportional control, where the action increases proportionally to the zone demand. While the demand remains below the Setpoint, the damper and valve remain closed. Once the demand ramps up past the Setpoint and the supply water mode is favorable, the valve opens, and the damper begins to open proportional to the demand. Once the demand hits the sum of the Setpoint and Proportional band, the damper will be fully open:

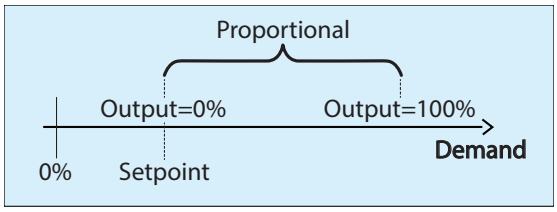

Figure 49 - Face & Bypass Damper Proportional Band

Note that analog output (AO2) for the Face and Bypass Damper uses standard voltage modulation expressed over the range configured in *section 5.2.5*.

5.6.2 - Reheating

The goal of the Reheating sequence is to maintain a designated reheat supply air setpoint.

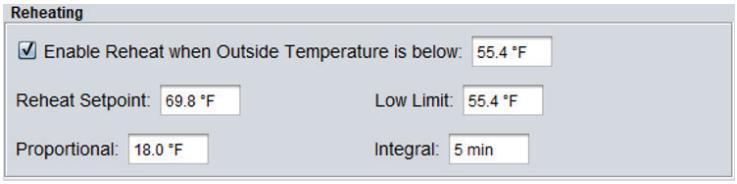

Figure 50 - Face & Bypass Reheating Configuration

Reheating is enabled when:

- The outside air temperature is below the reheat limit, or if the outside air temperature is invalid.
- There is a valid supply air temperature reading.
- The cooling demand is less than 10% and all cooling outputs are deactivated. If reheating does get deactivated due to a cooling demand of 10%, then the cooling demand must return to 0% before reheating will be enabled again.
- The Water Coil Mode must be in Heating
- Reheating is permitted when the economizer is opening for demand-based ventilation (CO_2)

For the Reheating sequence, the damper opening position is calculated based on a PI (Proportional / Integral) control loop. The Proportional component of the loop is determined as follows: As the supply temperature drifts below the setpoint, the Proportional component ramps up to compensate.

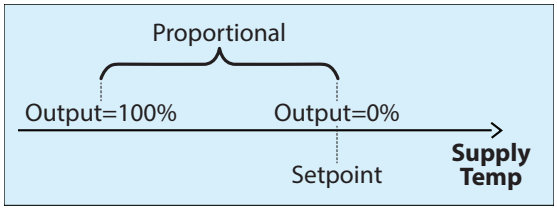

Figure 51 - Face & Bypass Reheat Proportional Loop

The Integral component is defined as the amount of time required to add 100% to the Reheat Damper Position due to a constant error of 1.8 °F (1 °C). Its purpose is to correct small errors over time.

The Proportional component is then added to the Integral component to calculate the final Reheat Damper Position. When properly tuned, this PI loop will maintain a constant supply air Setpoint in the duct.

If there is a simultaneous call for Reheat and demand-based Heat, the greater of the two resulting positions is used by the damper.

Low Limit: The Low Limit is a lower, alternate reheating setpoint which is used to maintain a safe air temperature in the supply duct during very cold winter periods. Unlike the normal reheat setpoint, it is authorized to be used even if there is a strong cooling demand, however cooling equipment must still be deactivated first.

Essentially, it is used during winter periods where a cooling demand is present (due to strong sunlight or other reasons), and there is an outside air damper in the system. When the supply air temperature gets too low, the outside air damper will naturally close to its minimum position, but sometimes this is not sufficient to maintain safe temperatures in the supply. This is where this alternate reheat low limit comes into play to protect the building.

5.6.3 - Movement Control

This section defines the restrictions placed on the Face & Bypass Damper movement to reduce wear.

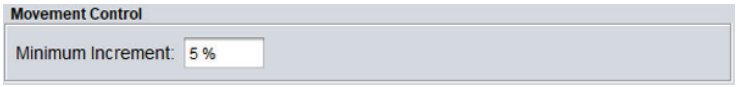

Figure 52 - Face & Bypass Damper Movement Control

Minimum Increment: This setting applies a differential on any damper movement. The damper must move by at least this amount each time, or not at all. The only exceptions are when the damper is going specifically to 0% or 100%.

5.7 - Economizer Setup

This section defines how the Economizer sequence operates. When the Economizer sequence is enabled, the UNV controller modulates an outside air damper to either maintain a supply air setpoint or to optionally respond to calls for demand-based ventilation (CO_2).

5.7.1 - Change Over

The Economizer cooling sequence is only enabled when it is cold enough outside.

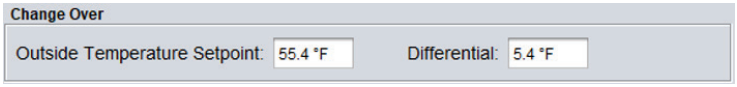

Figure 53 - Economizer Change Over

The activation and deactivation of the free cooling sequence is determined by the setpoint above, with a differential band centered around it, as follows:

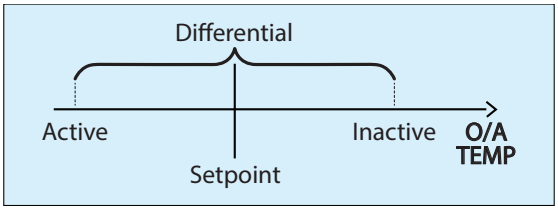

Figure 54 - Economizer Change Over Differential

Note that if the outside temperature reading is INVALID, the economizer cooling sequence is disabled, and the damper fully closes.

5.7.2 - Supply Setpoint

When the Economizer cooling sequence is active, the outside air damper modulates to maintain a supply air setpoint determined by the following configurable reset scale:

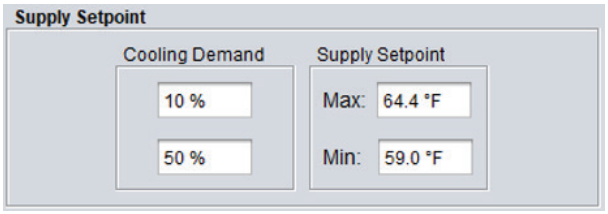

Figure 55 - Economizer Supply Setpoint Scale

When cooling demand is below the lowest point on the demand scale (10% in the image above), the economizer sequence is disabled and the damper maintains its minimum position.

As the cooling demand increases into the demand scale's range, the economizer sequence becomes enabled. The target supply temperature will drop proportionally as the cooling demand increases, until it hits the lowest point in the scale, at which point the target supply temperature will stop decreasing.

Note that if the supply air temperature reading becomes INVALID, the economizer cooling sequence is disabled, and the damper fully closes.

5.7.3 - Damper Setup

This defines the speed at which the outside air damper will move as it tries to reach the desired setpoint. Speed 1 is the slowest, speed 5 is the fastest.

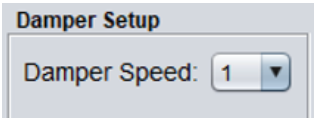

Figure 56 - Economizer Damper Speed

Slow this down for increased supply air temperature stability (but slower cooling response time).

5.7.4 - Minimum Damper Position

This section defines the minimum position of the outside air damper, depending on the currently active Fan Speed.

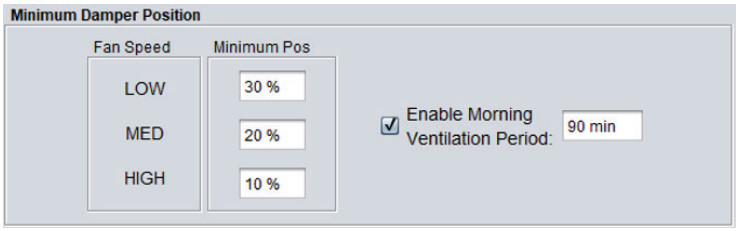

Figure 57 - Economizer Minimum Position

As the Fan speed increases, more outside air is drawn in, so the minimum position is lowered. This minimum position is applied at all times, except under any of the following conditions:

- When there is no Call or Proof of Fan
- When the system is in unoccupied mode
- When the Morning Ventilation Period is active
- When either the Supply Air or Outside Air temperature readings become invalid

Under any of these situations above, the minimum position becomes 0%.

In unoccupied mode, the damper minimum position becomes 0%, but it can still open on a call for cooling or for CO_2 reduction.

The Morning Ventilation Period is activated upon a transition from unoccupied mode back to occupied mode. During this limited period of time, the economizer's minimum position becomes zero. The purpose of this function is to make it easier to heat up the zone in the morning, and any concerns about air quality should be at a minimum since the building has just been unoccupied.

Note that this function only sets the damper minimum position to zero but will still open as necessary on a call for cooling or for CO_2 reduction.

5.7.5 - CO_2 Control

This screen is used to configure the demand-based ventilation sequence. The outside air damper will modulate open for air quality purposes in an attempt to reduce CO_2 concentration.

If the Economizer is already actively cooling, the widest opening position requested from either sequence (cooling vs ventilation) will be used to drive the outside air damper.

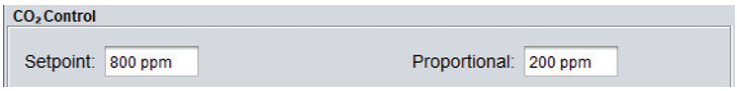

Figure 58 - CO2 Setpoint

Below the setpoint, the damper will remain at its minimum position, as defined in section 5.7.4. As the CO_2 level increases past the setpoint, the damper will open proportionally, until the point where the CO_2 reaches the (Setpoint + Proportional), at which point it will be fully open:

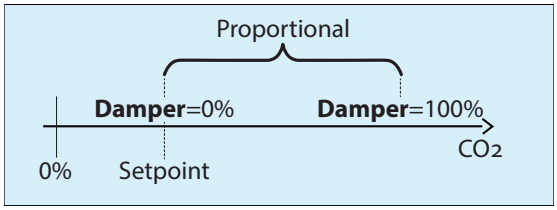

Figure 59 - CO2 Proportional Band

If the Fan is initially OFF when the CO_2 levels begin to increase past the setpoint, the controller will call for the fan to start and wait for proof before opening the damper.

5.7.5.1 - CO_2 Control Limits

There are two sequences that can limit the opening of the damper position during a call for more fresh air.

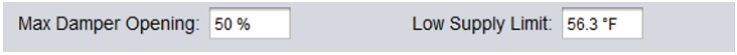

Figure 60 - CO2 Control Limits

The Maximum Damper Opening position blocks the damper from opening past that point, even when there is a strong CO_2 concentration. It is used to avoid artificially creating a heating demand in the building, with the tradeoff being a slower response time for air quality control. It is important to note that this maximum does not affect the economizer cooling sequence.

The outside air damper position can also be limited by the Low Supply Limit. When the supply air temperature goes below the limit, the outside air damper will begin to close until the limit is respected.

Both limiting sequences are simultaneously applied during demand-based ventilation. In other words, if the maximum damper position has been attained and then the supply air temperature gets too cold, the damper will begin to close until the limit is satisfied.

5.8 - Limits Configuration

The Limits section is used to establish temperature safeguards that can either taper off modulating heating activity or simply cut out any heat, cool or fan activity altogether.

5.8.1 - Supply Air

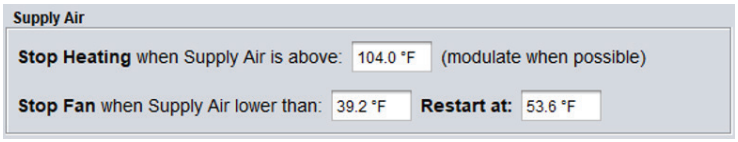

Figure 61 - Supply Air Limits

- **Heating Limit**: If the heating action is ON-OFF, heating will stop at the limit and be re-enabled again 9ºF (5ºC) below the limit. This is to prevent short cycling of the equipment should the supply air temperature fluctuate closely around this limit.

  If instead the heating action is modulating, the UNV controller will reduce its heating action so as not to rise above the limit.

- **Fan Stop Limit**: Prevents the fan from supplying very cold air into the building, for example if the outside air damper is stuck open and heating is not working. ***Note*** that this limit will be ignored for a period of 5 minutes following any normal activation of the fan. This is simply to give the heating equipment a chance to heat up the air first. This limit will not be ignored a second time if it is the reason the fan stopped in the first place.

If the supply air temperature reading is invalid, these limits are ignored.

5.8.2 - Outside Air

The outside air can be used to cut out heating or cooling action. The action is cut off completely, regardless if it is an ON-OFF or modulating action.

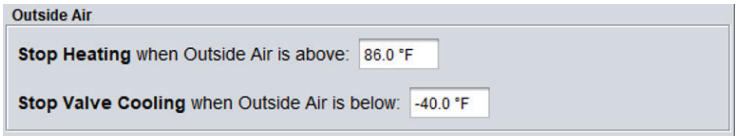

Figure 62 - Outside Air Limits

Once a limit is triggered, the outside air temperature must return by 1°C (1.8°F) inside the limit for control to be re-enabled again.

If the outside air temperature reading is invalid, these limits are ignored.

Note: The cooling limit only applies to cooling actions associated with a VALVE. This includes the Face & Bypass Damper, which will also close when the limit is tripped. However, the economizer is still allowed to open on calls for cooling.

5.9 - Calibration Configuration

This page is used to offset the various input readings provided to the controller by the attached sensors.

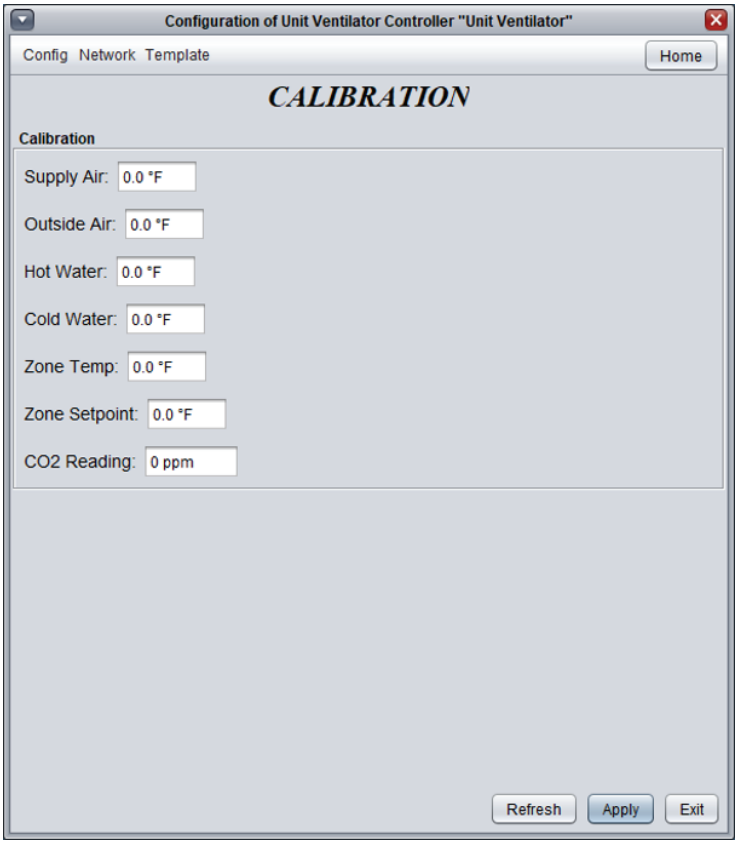

Figure 63 - Calibration Configuration

The options here may vary depending on the selected hardware and configuration.

5.10 - Device Properties

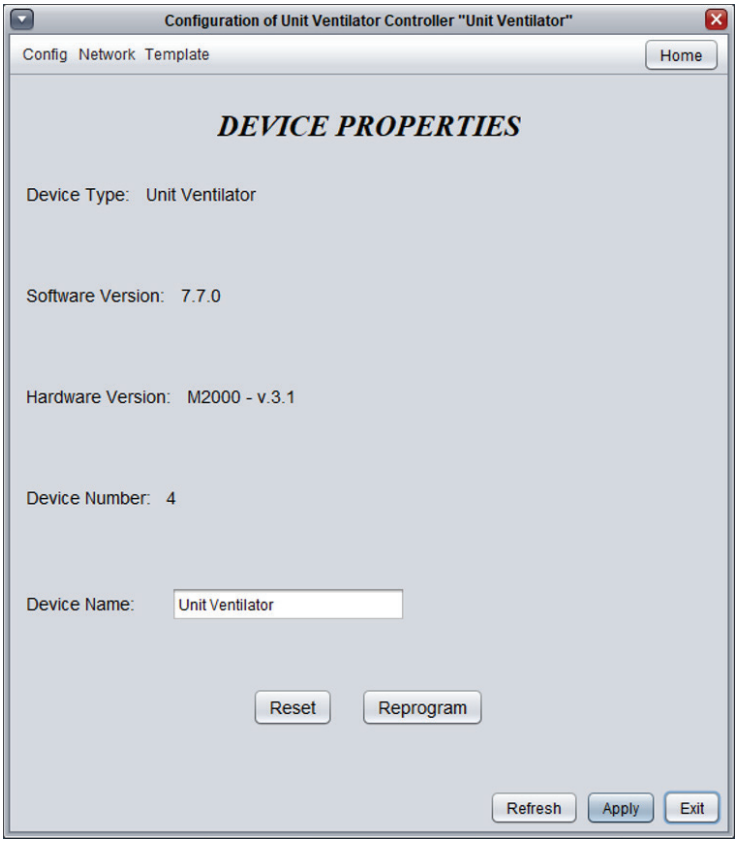

Figure 64 - Device Configuration

This screen shows all the intrinsic properties of the device you are configuring. This helps you determine its capabilities without having to visually inspect the device.

- **Device Type**: The type of controller you are configuring.
- **Software Version**: The current software in the controller. The greater the software version, the more advanced the device is. Devices can be upgraded by reprogramming them (see "Reprogram" below).
- **Hardware Version**: This is the physical nature of the controller. Different hardware has different features. The hardware can only be changed by replacing it physically.
- **Device Number**: The network address of the controller, which is configured manually using the dipswitches, or through software.
- **Device Name**: This field indicates the current name of the controller, which you can modify. Alternatively, you can right-click on the icon and select the rename option.
- **Reset Device**: Causes the device to reset as if it had been powered off and back on. All configuration properties REMAIN SAVED. However, resetting the controller removes all active overrides. This function is useful for debugging purposes.
- **Reprogram**: This function is used to upgrade the controller to a new software version. Focus will begin by asking you for the HEX file that contains the software update. Software update HEX files can only be provided by Prolon. At the end of the procedure, Focus will automatically reapply all the parameters you have previously configured into the device.

  Should there be any interruption during the programming procedure (due to intermittent communication or other), the procedure is halted to allow time for the problem to be fixed. When ready, the whole upgrade procedure can be resumed at any time by pressing this button again. It is normal for the icon to turn grey and become unresponsive during this period. Simply continue with the procedure anyway.

6.1 - Weekly Routines

This screen is used to configure weekly occupancy schedules.

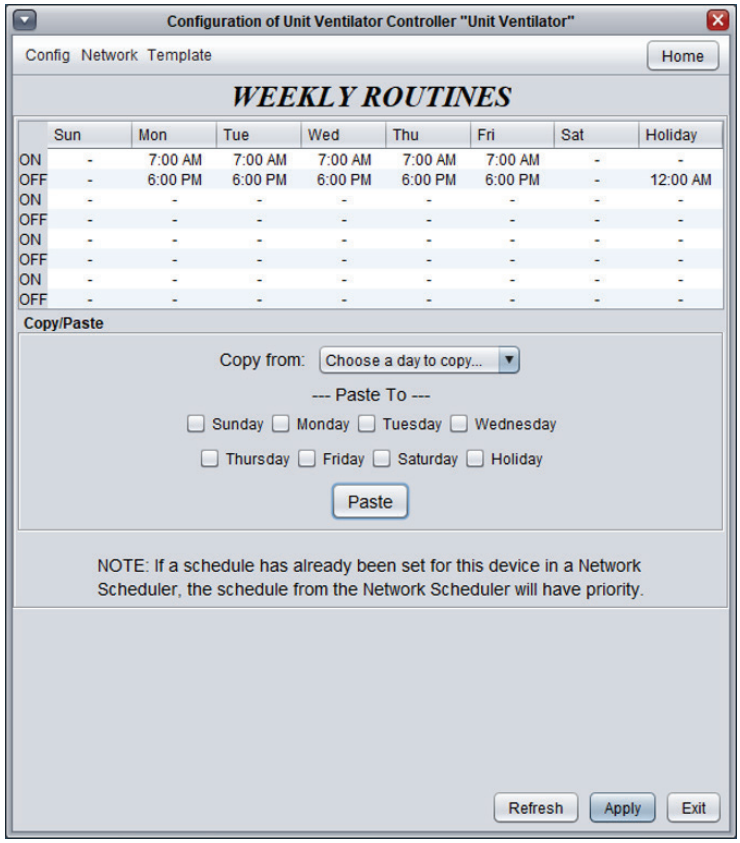

Figure 65 - Schedule Configuration

Weekly Schedule Grid: The Weekly Schedule Grid defines the weekly occupancy routine of the controller. Double-click a cell on the grid to edit it.

The occupancy status only changes when a valid time is encountered on the weekly schedule grid. For example, in the routine above, on Monday the device will be set to "Occupied" at 7:00 AM. At 6:00 PM, the device will be set to "Unoccupied" and remain so until the next valid time is encountered (7:00 AM the next day), where it becomes occupied again. The "Holiday" column will replace a normal weekday anytime the current date has been set as a holiday (see the next section).

The time can be displayed in either 12h or 24h format by changing the setting in the 'Options' menu, under 'Units', then 'Time Format'.

Note that if a Network Controller is present on the network and it has been configured to send a schedule to the ***Unit Ventilator Controller***, the schedule sent by the Network Scheduler will take precedence over the one set here.

Copy/Paste: The Copy/Paste function makes it easy to copy a particular day's schedule and apply it to other days of the week. Simply choose a day to copy from the drop-down list, select one or more days to paste to then click the "Paste" button.

6.2 - Holiday Calendar

This screen is used to define which dates are holidays so that the normal daily schedule can be replaced by an alternate holiday schedule. The calendar has no pre-defined holidays marked, allowing for complete customization of the holiday calendar upon initial configuration. The holiday calendar does not recognize floating holidays (Labor Day, Memorial Day, etc.) and thus must be adjusted annually.

Figure 66 - Calendar Configuration

Calendar Dates

On the selected days, the holiday occupancy routine defined in the Weekly Routines screen will replace the normal occupancy schedule of that day. After the day is over, the next day follows the standard schedule again.

To select or unselect a date, simply click on it. You can change months by clicking on the arrows at the bottom or by simply choosing the desired month from the drop-down list of months.

6.3 - Group Codes

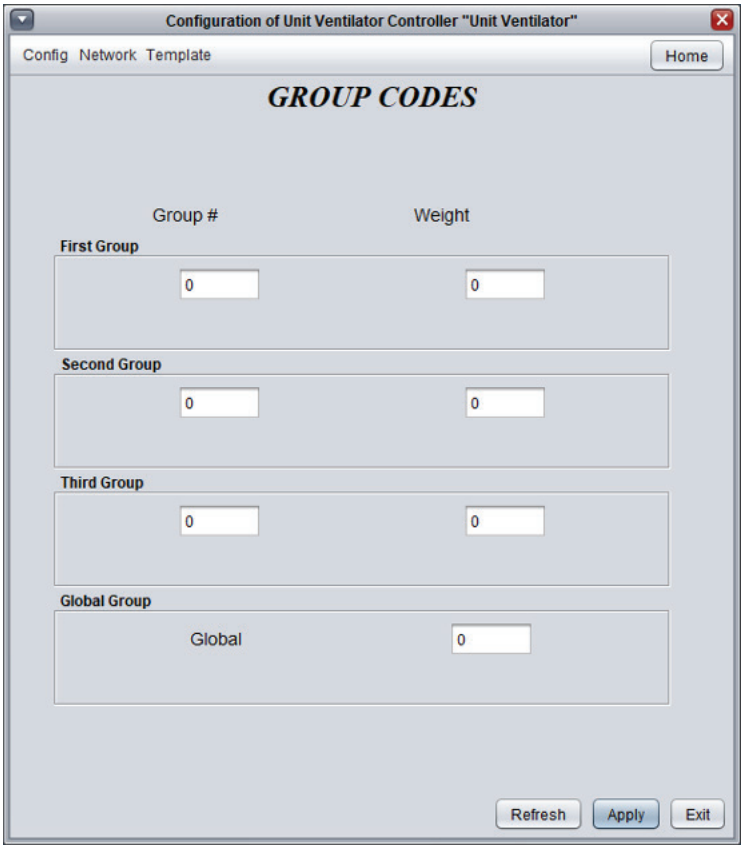

Figure 67 - Group Codes

This screen lets you configure which math groups the ***Unit Ventilator Controller*** should belong to, as well as the voting weight it should have in each group. This information is used by the network master as part of Prolon's Flexi-Zone math calculation system. A ***Unit Ventilator Controller*** can belong to three different groups at a time, as well as the global group.

- **Group #**: A group that the ***Unit Ventilator Controller*** belongs too. When this is set to zero, the ***Unit Ventilator Controller*** does not participate in a group.
- **Weight**: The weight of the ***Unit Ventilator Controller*** in the selected group. Used in weighted average calculations. Setting this to zero removes it from the group.
- **Global Weight**: The weight of the ***Unit Ventilator Controller*** in the global group. Used in weighted average calculations. Setting this to zero removes it from the global group.

6.4 - COM Port Settings

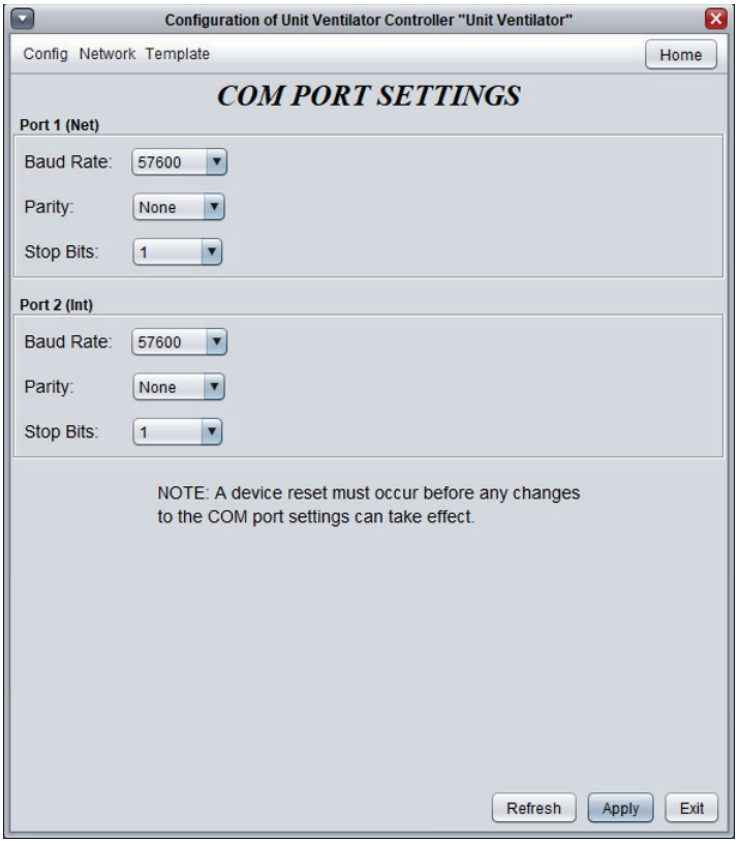

Figure 68 - COM Port Settings

Changes to the settings in this section will only take effect once the ***Unit Ventilator Controller*** is reset or has power cycled. Each port on the ***Unit Ventilator Controller*** has the same options. Please refer to the hardware guide for more details on COM port wiring.

7 - Template Menu

7.1 - Save Template

The template function gives you the ability to save the configuration of a particular ***Unit Ventilator Controller*** for future use, which can then be applied to any other ***Unit Ventilator Controller***, regardless of hardware platform. Each configurable property of the ***Unit Ventilator Controller*** is saved into this template file, except for its name. This function is very useful if you have many ***Unit Ventilator Controllers*** with the same or very similar configurations. You will be able to quickly copy and paste the configuration from controller to controller.

7.2 - Load Template

After saving a ***Unit Ventilator Controller*** configuration in a template, you can load this template into another ***Unit Ventilator Controller*** by selecting this menu item in the configuration screen of the ***Unit Ventilator Controller*** you wish to change. All configuration properties found in the template are then copied into the configuration screen for your viewing or possible modification. Once you are satisfied with the set of properties, click the "Apply" button.

Note: The template configuration will not be applied to the ***Unit Ventilator Controller*** until you click on the "Apply" button. If you do not wish to use the configuration properties of a loaded template, click on the "Refresh" or "Exit" buttons.

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