# ANTEC TOOLBOX

**MANUAL** v120

ANTEC controls by price

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# INTRODUCTION

## General

In this manual, you will find information regarding:

- Toolbox specifications
- How to connect to the Pace™ Critical Space Controller (PACE) and the Fume Hood Controller (FHC)
- Detailed description of all options available for each controller
- Troubleshooting information

## Product Overview

Antec Toolbox is a software tool designed to allow service and start-up personnel to configure Antec Controls products such as:

- Pace™ Critical Space Controller (PACE)
- Fume Hood Controller (FHC)

Some of its key features include:

- Easy-to-Use and intuitive layout
- Graphic layout that provides live feedback for select variables on one interface
- Balancing section for each valve
- Automatic software updates
- Built-in firmware updates for PACE
- Commissioning report generation

**CAUTION ▼**

This mark indicates an important point for the proper function of the controllers used with Toolbox. Improper setup may cause unit failure. Pay close attention to all caution points throughout this manual.

For local area support, please contact your local Antec Controls Representative

For more information visit www.AntecControls.com

# GETTING STARTED WITH TOOLBOX

## System Requirements

System requirements to run Toolbox:

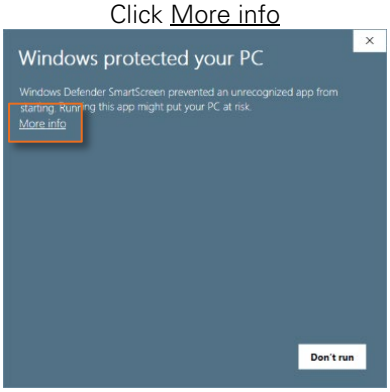
- Operating System: Windows 7 or higher
- CPU: 2 Gigahertz or faster
- RAM: 4 Gigabytes or more
- Hardware: Ethernet port **or** USB port and USB to Ethernet adapter

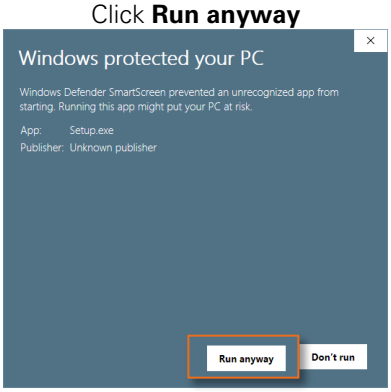
## Installation Instructions

To install Antec Toolbox

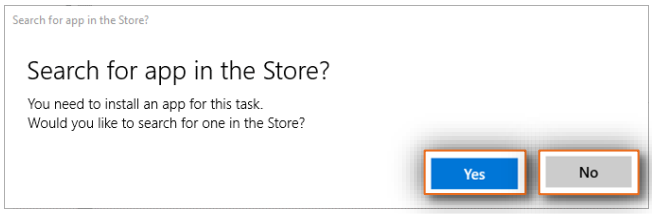
- Follow the link provided during the Antec Controls Technician Training class.
- Download the Antec Toolbox installer (Setup.exe)
- If prompted by Windows Defender:

Click More info then Click **Run anyway**




- If the following prompt is seen, click YES or NO:




**NOTE:** Clicking either option will result in successful installation of the software.

- Read the License Agreement and click Accept

### CAUTION ▼

If you are not prompted by Windows Defender™ to allow Antec Toolbox through the firewall. Proceed to the Adjusting Windows Defender™ Firewall Settings in the Troubleshooting section of the manual.

## How to Connect to PACE

Toolbox communicates to PACE by utilizing the Room Information Network (RIN). For more information on RIN, please refer to the PACE manual found at https://anteccontrols.com/products/#PACE.

There are (2) methods to connect to PACE:

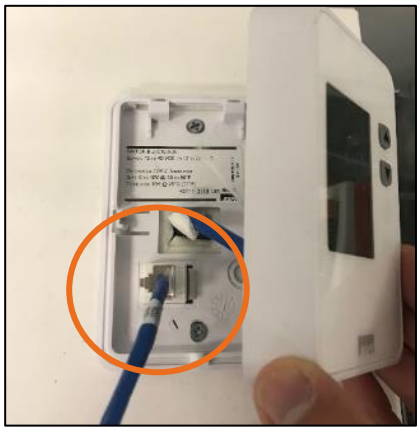
### Connecting to a Keystone Jack on the Thermostat

If ground level access is desired to perform setup, commissioning, and balancing then a pluggable Keystone Jack (CKJ) can be installed on the back plate of the thermostat and wired into the RIN network. By default, this CKJ is included in all thermostats provided by Antec Controls, except for models with $CO_2$ measurement.

**Tools Required:**

- Computer running Windows 7 or higher with Toolbox installed
- Ethernet cable

**Setup:**



**NOTE:** For RIN typical wiring diagram please reference the PACE manual or the project specific wiring diagrams.

**CAUTION**

The CKJ must be at the end of line (EOL) of the RIN network.

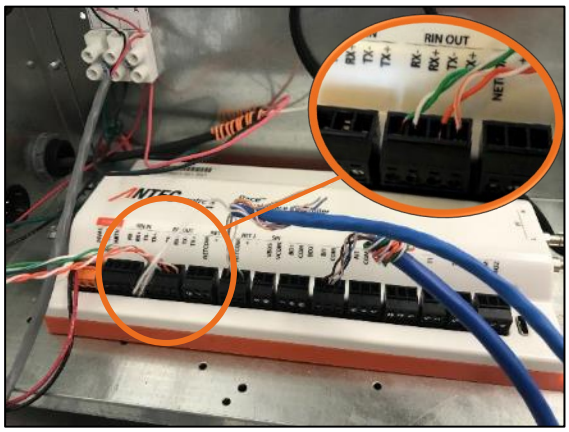
## Connecting Directly to PACE

If a CKJ is not installed, then the user must connect directly to the RIN port on PACE (typically mounted on the supply or general exhaust valves).

**Tools Required:**

- Computer running Windows 7 or higher with Toolbox installed
- Ethernet cable with RJ45 to 4-wire connection

**Setup:**




**NOTE:** For RIN typical wiring diagram please reference the PACE manual or the project specific wiring diagrams.

**CAUTION ▼**

When connecting directly to PACE, use an end of line (EOL) controller.

## How to Connect to the FHC

Toolbox communicates to the FHC utilizing a Linker Tool. The Linker Tool is a Price Industries proprietary connector used by Antec Controls and can be purchased through Antec Select. For more information on installing the software required for the Linker Tool please refer to the Linker product information at https://www.priceindustries.com/linkersoft.

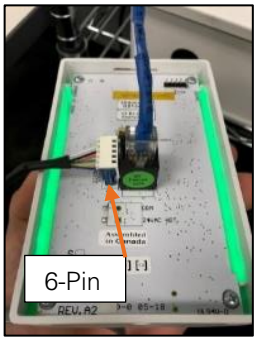
There are (2) methods to connect the Linker tool to the FHC:

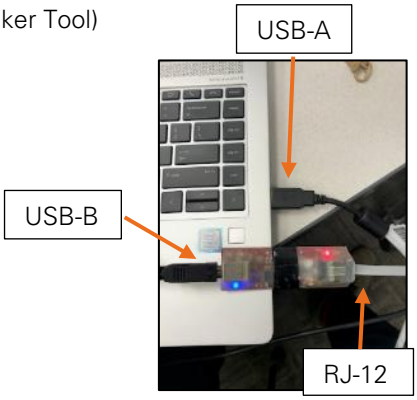
### Connecting to the Fume Hood Interface (FHI)

For ground level access, there is a Linker Service Connection on the back of the FHI that is mounted on the fume hood. This connection is present on every fume hood that has an Antec Controls FHI.

Tools required:

- Computer running Windows 7 or Higher with Toolbox and Linkersoft2 installed
- Linker Tool
- USB-A to USB-B cable (provided when ordering the Linker Tool)
- RJ12 to 6-pin connector cable (provided when ordering the Linker Tool)



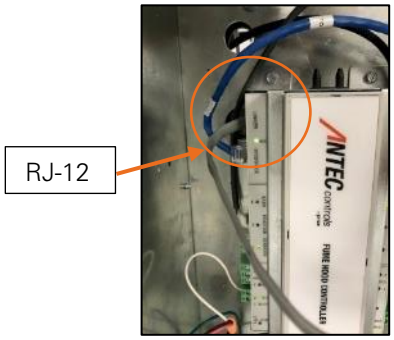



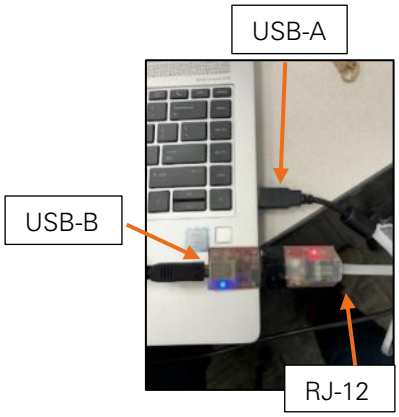

### Connecting directly to the FHC

If an FHI is not available, there is also a Linker Service Connection on the FHC (typically mounted on the fume hood exhaust valve).

Tools required:

- Computer running Windows 7 or Higher with Toolbox and Linkersoft 2 installed
- Linker Tool
- USB-A to USB-B cable (provided when ordering the Linker Tool)
- RJ12 cable (provided when ordering the Linker Tool)



## Toolbox Start-up

Upon start-up of the software, the user is prompted with the following screens.


**Loading Screen**

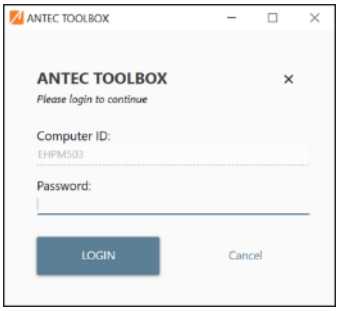
When opening Toolbox, the loading screen will display the current software version that is running on the computer. If there is a new version available, Toolbox will automatically update. This ensures users are always running the newest software version.

It will also check for the latest PACE firmware. If what it has locally is not the latest version, it will download the latest version.

It is **always** recommended that firmware is updated prior to arriving on site when beginning the start-up process.

**CAUTION ▼**

An Internet connection must be present for Toolbox to detect that an update is available. Always open Toolbox on an Internet connection before going to the job-site to ensure it is up to date.



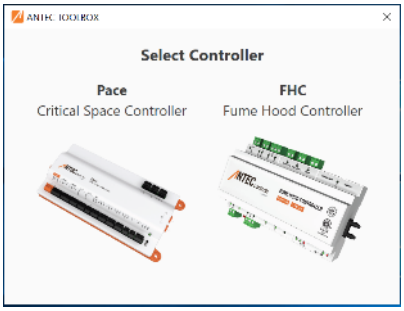

**Login Screen**

After Antec Toolbox has loaded, the user is prompted with a Login Screen.

The Computer ID field will auto-populate with the user's computer name.

**NOTES:**

- The password is provided only to Antec Controls Certified Trained Technicians.
- The password will only need to be entered once for every Antec Toolbox software update.




**Controller Selection**

After logging in, select the controller that requires configuration.

This manual will cover both sections of the software. Click the links below or navigate to the page number shown in the Table of Contents for detailed descriptions of each of the settings for PACE or the FHC.

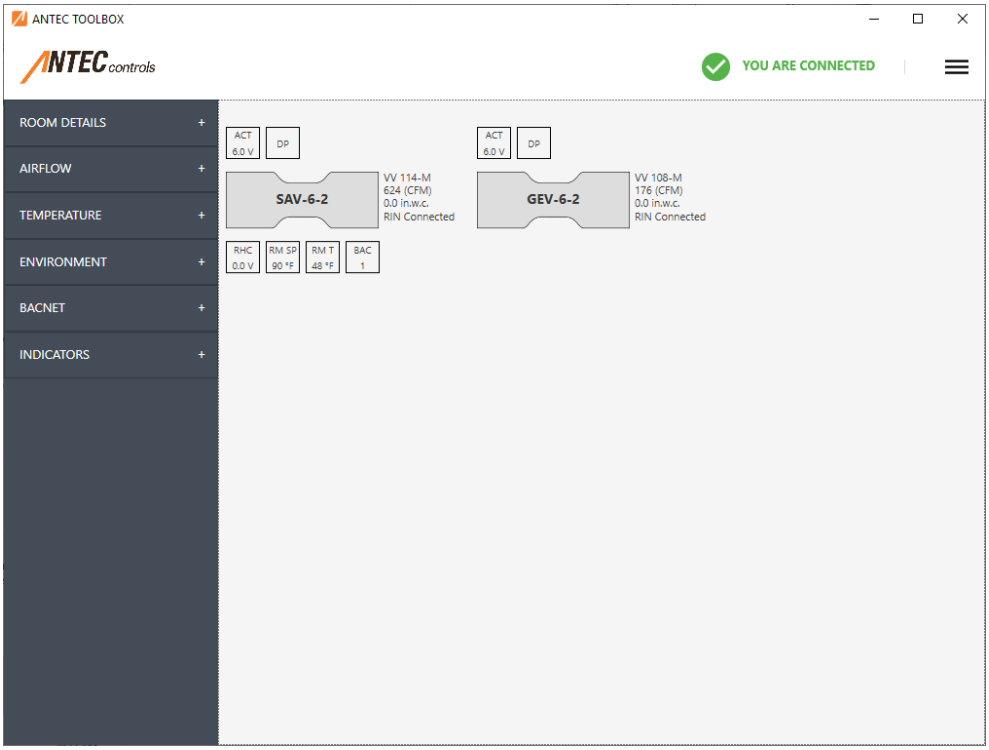
PACE

FHC

# PACE

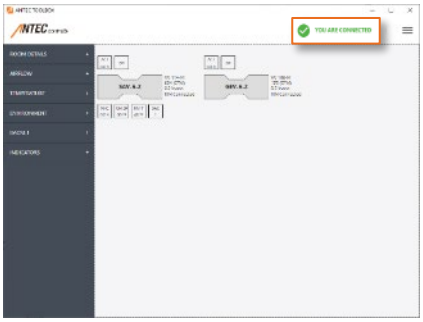
## Home Screen

After selecting PACE, the user is presented with the following screen:




In the example above, two PACE have been detected on the RIN network. The room has already been configured: Toolbox has populated with the configured devices for each PACE and the configured sequencing for the room.

The Home Screen provides the user with useful information regarding the room's operation.



**Connection Status**

Display to show whether Toolbox is currently connected to PACE on the RIN network.

**NOTE:** If a connection is not detected upon initial start-up, a dropdown will be available to select a different network port.

### Menu Button

Click this dropdown to access the settings for the room's functionality. See the PACE – Settings section of this manual for further information on available settings in each menu.

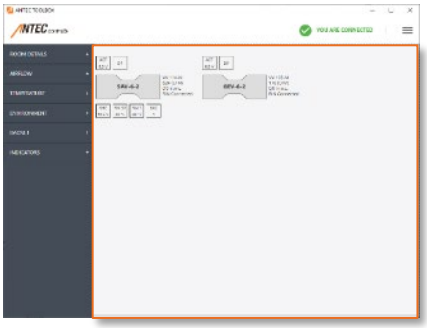
| Menu/Option | Description |
|---|---|
| Room Sequence Manager | Allows the user to configure high-level room settings, the airflow control sequence and temperature and DCV control sequences if applicable. |
| Room Mode Manager | Allows the user to configure room airflow and temperature setpoints per room mode. Multiple modes of operation can be configured to allow for energy savings and emergency operation. |
| Airflow Staging | Allows user to stage airflow devices, if required. |
| Temperature Zones | Allows the user to configure the staging for reheat and/or cooling devices, add airflow for temperature control and set up multiple temperature zones, if required. |
| Indicators | Allows the user to configure alarms that are to be displayed on BACnet or trigger a binary output when active. |
| Advanced BACnet Settings | Allows the user to rename and/or reorder BACnet points to conform to any building standards for naming conventions. |
| Firmware Updates | Allows the user to update to the latest PACE firmware or update to an older firmware version with a provided firmware file |
| Diagnostics | Allows the user to view controller file listings, restart controllers, remove room configuration and retrieve diagnostic files for troubleshooting. |
| User Settings | Allows the user to adjust the units from imperial to metric. |
| Commissioning Report | Generates a CSV file containing all configured settings for the room |
| Help | Displays current software version, Field Support contact information and access to software changelog |

### Left Bar

Displays room level configuration information, provides live updates for sequence related readings and indicator status.

| Section Name | Description |
|---|---|
| Room Details | Displays general room information including room name, airflow sequence, pressurization, control method, room status, room mode, current room pressure and air changes per hour |
| Temperature | Displays current and target temperature readings for each temperature zone. |
| Environment | Displays readings from environmental sensors including relative humidity, $CO_2$ and VOC. |
| BACnet | Displays BACnet device instance, MAC address and baud rate. |
| Indicators | Displays status of all indicators. |

**NOTE:** The left bar is always shown for live updates on the room's operation



### Main Display

Displays all valves with a PACE, live updates for valve airflow and pressure and all configured inputs and outputs.

Inputs and outputs for each PACE are configured by clicking on the valve icon. This will open the PACE MANAGER page for that controller.

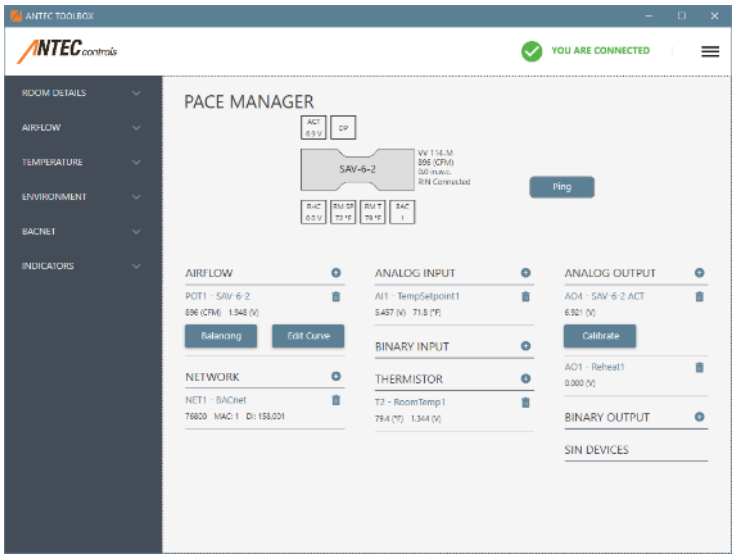
**CAUTION**

FHC valves are visible after configuring the Fume Hood Network (FHN) and values are read only. FHCs must be configured using the FHC portion of Toolbox.

## PACE Manager Menu

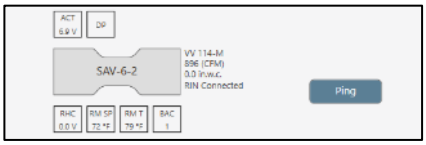
When on the Home Screen, click on the valve that requires configuration to open the PACE Manager Menu.

This menu allows the user to configure devices for airflow, configurable networks, thermistors, inputs, outputs and SIN devices for the selected PACE.




### Controller Information

The top of the page shows a brief overview of the Valve and all its configured devices.




**Controller Information**

Whenever the user adds a device to the controller, it will create a card. The cards will display above and below the valve's image with the live readings from the input or output.

- Cards above the valve are related that specific valve's operation
- Cards below the valve are related to the room's overall operation

**NOTE:** The graphic on the Home Screen will display the same image shown here, including the cards.

The Ping button is used to identify the controller being configured. The LED on the selected PACE will begin flashing green when the Ping function is activated.

**NOTE:** Ping only works for PACEs that are configured and have a solid green light.

Live updates to the right of the valve will show the following:

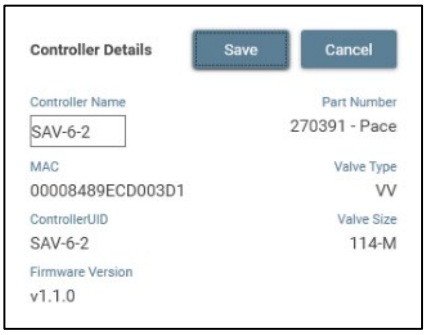
- Model information from the valve's linestring (ex: VV-114-M indicates a single size 14 Venturi Valve designed for medium pressure operation)
- Airflow reading
- Valve differential pressure *(available for VV only)*
- Connection Status
  - RIN Connected = operating normally
  - RIN Unstable = intermittent RIN connection
  - RIN Offline = no RIN connection
  - Network Fault = error with either NET1 or NET 2. Will show BACnet, FHN, SIN, NET1 or NET2 fault depending on the usage of the network port where the error is detected

**NOTES:**

- The controller's name (ex: GEV-9-1) and the image (VV, VFX or TU) for the valve will auto-populate using the valve information from the valve's linestring.
- RIN connection errors will take priority over the Network Fault status. If RIN Unstable, RIN Offline, or Network Fault is observed, please refer to the Troubleshooting section of this manual.

**CAUTION**

When a room configuration is being saved, RIN connection will intermittently say RIN Offline while controllers power cycle.




**Controller Details**

The controller details menu displays important information about the controller. Access the menu by clicking on the picture of the valve in the PACE Manager menu.

| Variable Name | Description |
|---|---|
| Controller Name | Allows the user to edit the controller name that appears in Toolbox. The controller's name will also display on BACnet as a pre-fix to AI, AO, BI and BO objects.<br><br>**NOTE:** The Controller Name is limited to 15 characters. |
| MAC | Displays the unique MAC for the controller provided by Antec Controls. |
| Controller UID | A Unique Identifier used to identify each controller on the RIN network. This UID comes from the factory order and matches the Serial Number for the valve (if provided by Antec Controls). |
| Firmware Version | Current firmware running on the selected PACE. |
| Part Number | The Antec Controls part number for PACE firmware. |
| Valve Type | Displays the valve type loaded from the valve's linestring. |
| Valve Size | Displays valve size loaded from the valves linestring. |

## Devices

Any inputs/outputs that are configured on a PACE are referred to as Devices.


**Devices**

Many device types are configurable for the selected PACE:

| Variable Name | Description |
|---|---|
| Airflow | Configure the controlled valve. VV and VFX will be automatically configured with default settings from the linestring |
| Network | Configure NET1 and NET2 for FHN, SIN or BACnet. |
| Analog Input | Configure multiple usages for AI1 – AI4 using a 0 – 10 VDC input. |
| Binary Input | Configure multiple usages for BI1 and BI2 using a contact closure. |
| Thermistor | Configure multiple usages for T1 and T2 using a Thermistor. |
| Analog Output | Configure multiple usages for AO1 – AO4 using a 0 – 10 VDC output. |
| Binary Output | Configure multiple usages for BO1 and BO2 to output 24 VAC when active. |
| SIN Devices | Displays any currently detected SIN Devices after configuring the network. |

**NOTE:** Up to 15 devices can be configured per PACE controller (excluding devices shown in the Network section).

**Adding, removing, and editing devices:**

- To add a device, click the  button.
- To edit a device's setup, click the device's name. 

- To remove a device, click the  button.

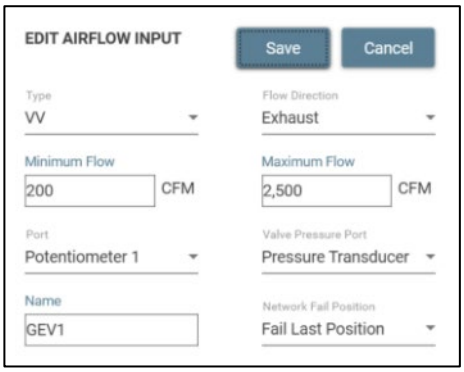
**NOTE:** Live readings are also visible for the devices' input/output voltage or state and the value that corresponds to the particular usage that has been selected.

## Airflow Devices

Airflow devices are required when PACE is measuring and controlling an airflow control device to maintain an airflow setpoint. These are only required for an input that is actively being measured and controlled by PACE.

Instructions and settings for an airflow input for a Venturi Valve (VV), Venturi FX Valve (VFX) and Terminal Unit (TU) are below.

**NOTE:** The airflow device will come pre-configured based on the linestring for the valve. Typically, the airflow device will not require any configuration.



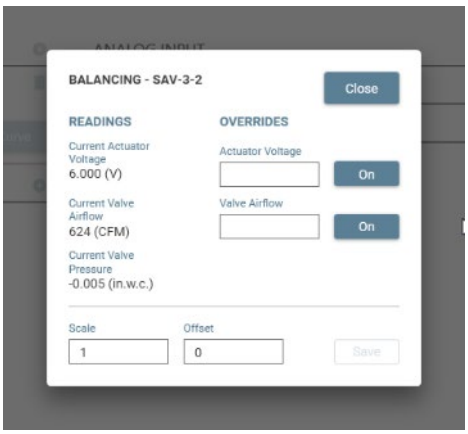

**Airflow Input *(VV)***

Below are the settings associated with configuring a Venturi Valve airflow input. The following settings are available if the TYPE is set to VV.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Flow Direction | Exhaust<br>Supply | Flow direction of the valve controlled by PACE |
| Minimum Flow | 0 | Limits the minimum operating range of the valve. Typically set to the full minimum of the valve. |
| Maximum Flow | Maximum flow corresponding to the operating range of the valve | Limits the maximum operating range of the valve. Typically set to the full maximum of the valve. |
| Port | Potentiometer 1<br>Potentiometer 2 | The physical port where the potentiometer for the Venturi Valve is connected.<br><br>**NOTES:**<br>• Single and Dual VVs are wired with ONE POT on Potentiometer 1.<br>• Triple VVs are wired with TWO POTS on Potentiometer 1 and 2 respectively. |
| Valve Pressure Port | Pressure Transducer<br>Analog Input 1 – 4 | Differential pressure measured to confirm the venturi valve is operating within its required pressure range.<br><br>Pressure Transducer is the on-board pressure transducer installed on every PACE.<br><br>**NOTE:** If using a 3rd party sensor with 0 – 10 VDC output for the differential pressure measurement, AI 1 – 4 can be assigned for differential pressure. |
| Name | 19 characters | The name for the airflow device.<br><br>**NOTE:** This name will display on BACnet as part of the Analog Values for the POT reading. |
| Network Fail Position | Fail Last Position<br>Fail Fully Open<br>Fail Fully Closed | Sets the fail position for the Airflow Device if a PACE goes offline on the RIN network. |

**CAUTION**

Ensure the valve's operation is not limited by the minimum flow or maximum flow. In rooms with fume hoods where the valve may have to modulate based on fume hood usage, the valve may need to exceed the design flows in the design documents in order to maintain the room's flow offset.



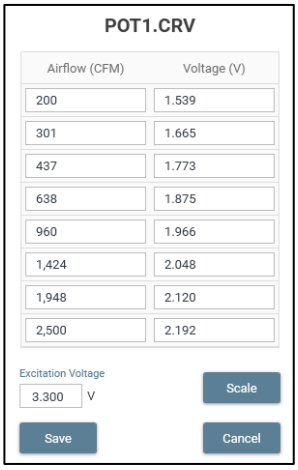

### Balancing *(VV)*

The balancing menu is used to adjust the airflow reading from the PACE to match a Test and Balance (TAB) reading.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Current Airflow | Read Only | Live reading of the airflow being reported by the Venturi Valve. |
| Valve Pressure | Read Only | Live reading of the pressure drop across the Venturi Valve.<br><br>**NOTE:** Pressure drop is crucial to optimal performance of the venturi valve. Ensure the valve is within its operating limits during balancing. |
| Scale | 0.5 to 2.0 | Scales PACE's airflow reading by a multiplication. EX: If PACE displays 1000 CFM and TAB measures 1050 CFM, set the Scale to 1.05.<br><br>**NOTE:** This should be the primary balancing tool. |
| Offset | -1000 to 1000 | Offsets PACE's airflow reading by a set increment. EX: If PACE displays 230 CFM and TAB measures 250 CFM, set the Offset to +20 CFM.<br><br>**NOTE:** This should be a secondary balancing tool. |
| Voltage | 0 to 10.5 Volts | Provides the user with a voltage override to drive the actuator to a set position. This can be used to target different airflows for balancing. |
| Override | On/Off | Click to enable/disable the Actuator Override. When enabled, the button appears ORANGE and allows the user to enter values into the Voltage field.<br><br>**NOTES:**<br>Tab out of the voltage box when the override is active to change the override value.<br>The override is automatically removed after closing the window. |

**NOTE:**

- Ensure any scale or offset values are saved before exiting the menu. If the values are not saved, then they will need to be re-entered.
- Airflow Overrides are only available with PACE firmware v1.1.1 or later




### Edit Curve *(VV)*

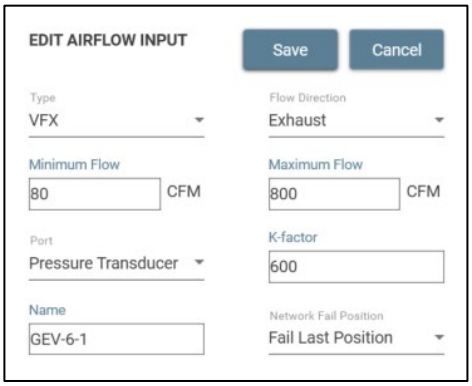
The edit curve menu is used to adjust the POT curve loaded onto PACE. The main use for the edit curve menu is for Venturi Valve Retrofit (VVR) kits.

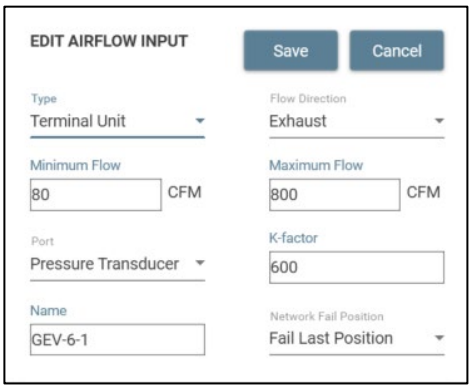
For replacement POT curves, contact Antec Field Support.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Excitation Voltage | Controller Dependent | Allows the user to input the controller's excitation voltage.<br><br>**NOTE:** The excitation voltage for PACE is 3.3 VDC. |
| Scale | On/Off | Click to scale a POT curve to an excitation voltage of 3.3 VDC. When selected, the POT curve voltage values will change to correspond with an excitation voltage of 3.3 VDC.<br><br>**NOTES:**<br>• The voltage values will change when scaling the POT curve.<br>• The scaling function is only required when the original excitation voltage differs from 3.3 VDC. |

**NOTES**:

- The curve point flow and voltage values must be equal or increase from Point #1 to Point #8.
- When configuring VVR kits the POT curve and excitation voltage are input in this menu.




**Airflow Input *(VFX/TU)***

Below are the settings associated with configuring a VFX or TU airflow input. The following settings are available if the TYPE is set to VFX or TU.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Flow Direction | Exhaust<br>Supply | Flow direction of the valve being controlled. |
| Minimum Flow | 0 | Limits the minimum operating range of the valve. Typically set to the minimum of the valve. |
| Maximum Flow | Maximum flow corresponding to the operating range of the valve | Limits the maximum operating range of the valve. Typically set to the maximum of the valve. |
| Port | Pressure Transducer | The physical port where the pressure transducer for the VFX or TU is connected.<br><br>This pressure will be used to calculate the airflow through the valve using the following equation:<br><br>$Q = K * \sqrt{dP}$<br><br>**NOTE:** The on-board pressure transducer must be used for VFX or TU applications. |
| Name | 19 characters | The name for the airflow device.<br><br>**NOTE:** This name will display on BACnet as part of the Analog Values for the flow reading. |
| K- factor | 0 to 15000 | Sets the K-factor of the valve. The K-factor will be adjusted based on the TAB airflow measurements.<br><br>**NOTE:** The baseline K-factor values for each valve size can be found in the VFX product manual on the Antec Controls website. |
| Network Fail Position | Fail Last Position<br>Fail Fully Open<br>Fail Fully Closed | Sets the fail position for the airflow device if a PACE controller goes offline on the RIN network. |

## CAUTION ▼

Ensure the valve's operation is not limited by the minimum flow or maximum flow. In rooms with Fume Hoods where the valve may have to modulate based on fume hood usage, the valve may need to exceed the design flows in the design documents in order to maintain the room's flow offset.


### Balancing *(VFX/TU)*

The balancing menu is used to adjust the VFX or TU reading on PACE to match a Test and Balance (TAB) reading.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Current Airflow | Read Only | Live reading of the airflow being reported by the Venturi Valve. |
| Valve Pressure | Read Only | *Not applicable for VFX or TU applications.* |
| K-factor | 0 to 15000 | Sets the K-factor of the valve. The K-factor will be adjusted based on the test and balancer airflow measurements using the following formula:<br>$(New\ K) = \frac{TAB\ reading}{PACE\ reading} * (Starting\ K)$<br>**NOTE:** The standard K-factor values for each valve size can be found in the VFX product manual on the Antec Controls website. |
| Voltage | 0 to 10.5 Volts | Provides the user with a voltage override to drive the actuator to a set position. This can be used to target different airflows on the valve for balancing. |
| Override | On/Off | Click to enable/disable the actuator override. When enabled, the button appears ORANGE and allows the user to enter values into the Voltage field.<br>**NOTES:**<br>• Tab out of the voltage box when the override is active to change the override value.<br>• The override is automatically removed after closing the window. |

**NOTES:**

- Ensure the K-factor value is saved before exiting the menu. If the value is not saved, then it will need to be re-entered.
- Airflow Overrides are only available with PACE firmware v1.1.1 or later


### PID Tuning *(VFX/TU)*

The PID tuning menu allows for the adjustment of proportional, integral and derivative values for the VFX or TU.

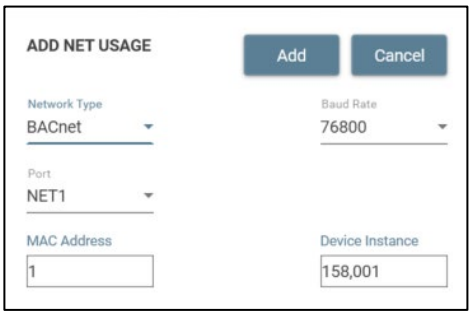
For supplementary information on adjusting PID settings for blade damper control contact Antec Field Support.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Proportional | No Limits | Sets the proportional gain value used to control the damper blade. |
| Integral | No Limits | Sets the integral value used to control VFX damper blade. |
| Derivative | No Limits | Sets the derivative value used to control VFX damper blade. |
| Integral Cap | No Limits | Sets the limit for the integral term of the PID settings used to control damper blade. |
| Deadband | 0 to 10% and<br>0 to 30 CFM | Sets the deadband for the CFM control through the valve. PACE will determine whether the control is in the deadband based on the larger of the CFM or % values.<br>**NOTE:** The % deadband is based on the % of current flow target. If PACE is targeting 1000 CFM and the deadband is 5% of 1000 CFM. It will maintain position until the reading goes outside of the range between 950 – 1050 CFM. |

**NOTE:** Before adjusting the proportional, integral and derivative values contact Antec Field Support for instruction.

## Network

This section details configuration instructions and available settings for networks including BACnet, the fume hood network (FHN) and the sensor information network (SIN).




### BACnet

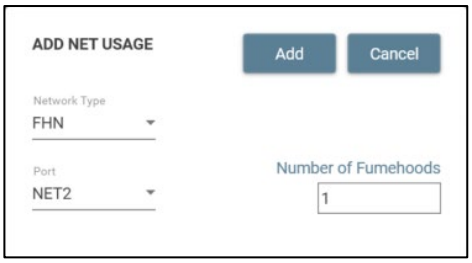
BACnet is the communication protocol used to provide the Building Automation System (BAS) with information about how the room is currently functioning. Additionally, it provides overrides from the BAS to control certain functions within the room.

The following settings are available if the Network Type is **BACnet**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | NET1<br>NET2 | Choose the configurable network port where BACnet is physically wired to the PACE. |
| MAC Address | 1 to 127 | The MAC address is used locally on the MS/TP segment to physically address devices. The MAC address is not passed through routers.<br><br>**NOTE:** This must be unique for each device within the MS/TP segment. |
| Baud Rate | 9,600<br>19,200<br>38,400<br>76,800 | The rate at which information is transferred over the BACnet network.<br><br>**NOTE:** All devices on a BACnet segment must be set to communicate at the same baud rate. |
| Device Instance | 1 to 4,194,303 | Whether on an MS/TP segment or IP network, the device instance is the logical address that matters to BACnet.<br><br>**NOTE:** This must be a unique address throughout the entire facility. |

**NOTES:**

- Only one BACnet connection is allowed per RIN network.
- All BACnet points for the room will go through the one connection.




### Fume Hood Network (FHN)

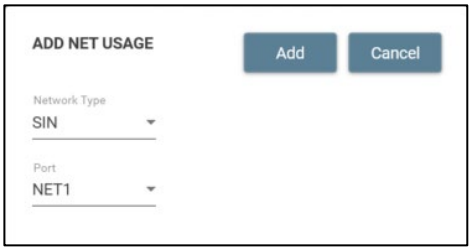
The FHN allows PACE to communicate with the FHCs in the room so they can be included in the room's flow offset calculation and also provide diagnostic information for the FHC using the same BACnet connection as the RIN network.

The following settings are available if the Network Type is **FHN**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | NET1<br>NET2 | Choose the configurable network port where FHN is physically wired to the PACE. |
| Number of Fume hoods | 1 to 16 | Select the number of fume hoods that reside on the physical FHN.<br><br>**NOTE:** A maximum of 16 fume hoods are allowed on one fume hood network. |

**NOTES:**

- Only one FHN connection is allowed per RIN network.
- Addressing for the FHCs that are communicating on FHN must be done in the FHC setup.




### Sensor Information Network (SIN)

SIN allows PACE to communicate with any SIND devices used in the room. This includes the SIN Room Pressure Sensor (SRPS), which can be used to either monitor or control room pressure in a space.

The following settings are available if the Network Type is **SIN**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | NET1<br>NET2 | Choose the configurable network port where SIN is physically wired to the PACE. |

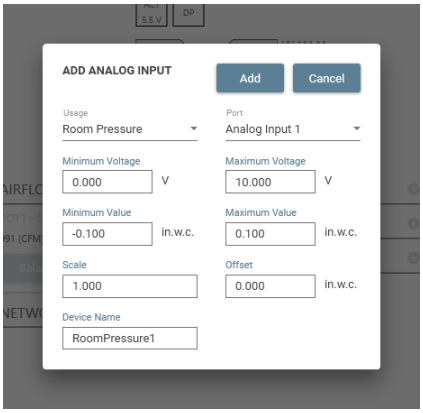
**NOTES:**

- Only one SIN connection is allowed per RIN network.
- SIN can support up to three SIND devices on each individual network.

## Analog Inputs

This section details configuration instructions and available settings for analog inputs including room pressure, temperature setpoint, humidity, $CO_2$, VOC, duct pressure, room temperature, DAT, air temperature, ACH and airflow.

**NOTE:** A maximum of four analog inputs are configurable per PACE.

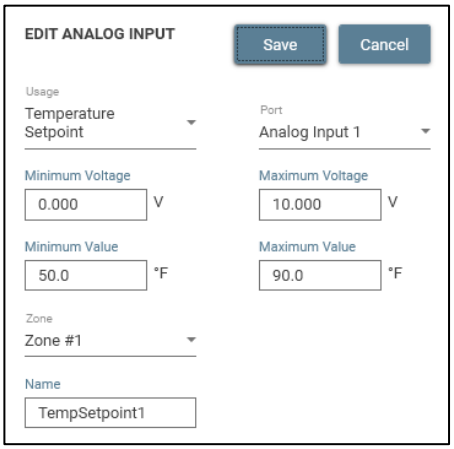



**Room Pressure**

Room pressure can be used for either monitoring or controlling the pressure differential in a given room.

The following settings are available if the Usage is **Room Pressure**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Scale Factor | 0.5 to 2.0 | Scales PACE's pressure reading by a multiplication.<br>EX: If PACE displays 0.01 in.w.c. and TAB measured 0.011 in.w.c., set the scale to 1.1<br><br>**NOTE:** This should be the primary balancing tool. |
| Offset | -0.005 to +0.005 in.w.c. | Offsets PACE's pressure reading by a set increment. EX: If PACE displays 0.00 in.w.c. and TAB measures -0.002 in.w.c., set the offset to -0.002 in.w.c..<br><br>**NOTE:** This should be a secondary balancing tool. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

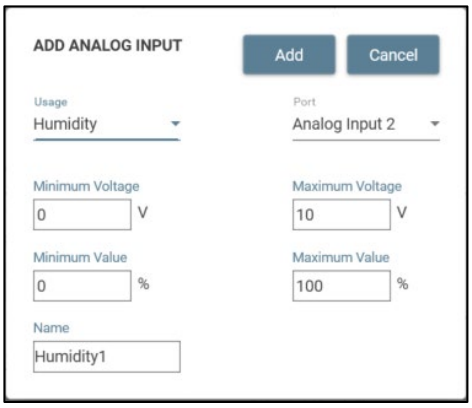



### Temperature Setpoint

Temperature Setpoint is used to drive the temperature in the room either hotter or colder based on a locally adjusted input from the room user.

The following settings are available if the Usage is **Temperature Setpoint**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Zone | Zone #1<br>Zone #2<br>Zone #3 | Assigns the Temperature Setpoint input to control the setpoint in either Zone #1, #2, or #3.<br><br>**NOTE:** The number of zones available will change depending on how many temperature zones are configured. See the Temperature Zones menu for more information on creating temperature zones. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |



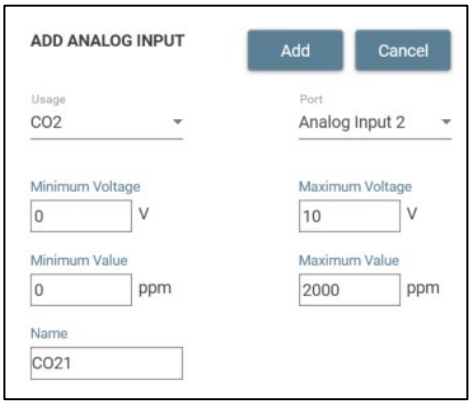

### Humidity

Humidity is used when PACE is required to monitor a humidity reading in either a room or in the duct.

The following settings are available if the Usage is **Humidity**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** PACE supports humidity monitoring only.



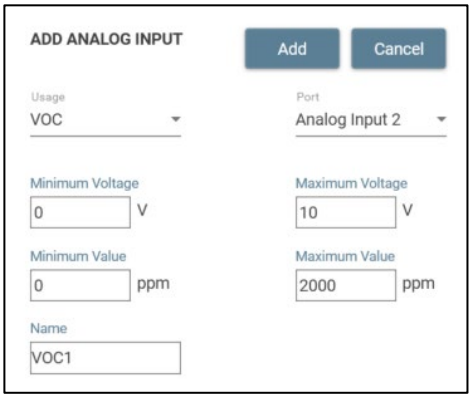

**$CO_2$**

$CO_2$ is used to monitor the carbon dioxide levels in a room.

The following settings are available if the Usage is **$CO_2$**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** PACE supports $CO_2$ monitoring only.



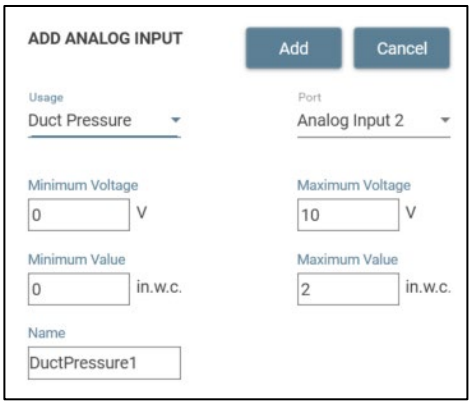

**VOC**

Volatile Organic Compounds (VOC) are used to monitor contaminants in the air.

The following settings are available if the Usage is **VOC**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** PACE supports VOC monitoring only.



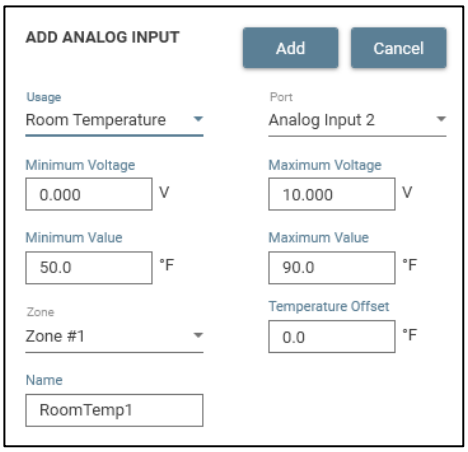

**Duct Pressure**

Duct pressure monitoring may be useful in determining if the duct static pressure is in an acceptable range so the airflow device can effectively control airflow.

The following settings are available if the Usage is **Duct Pressure**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** PACE supports duct pressure monitoring only.

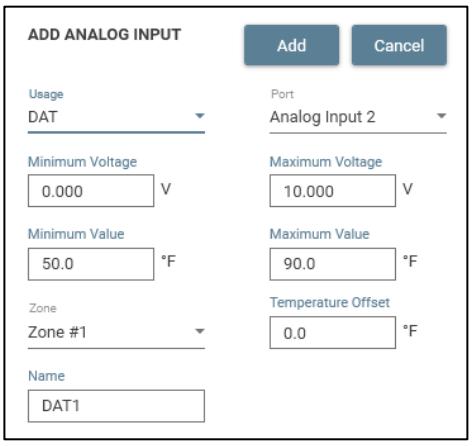



**Room Temperature**

This room temperature reading is used in the temperature control sequence for the configured temperature zone.

The following settings are available if the Usage is **Room Temperature**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Zone | Zone #1<br>Zone #2<br>Zone #3 | Assigns the Room Temperature input to either Zone #1, #2 or #3.<br><br>**NOTE:** The number of zones available will change depending on how many temperature zones are configured. See the Temperature Zones menu for more information on creating temperature zones. |
| Temperature Offset | No Limits | Allows the user to adjust the temperature reading to match a reading from a balancer or commissioning agent. Applies a fixed offset to the room temperature reading. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

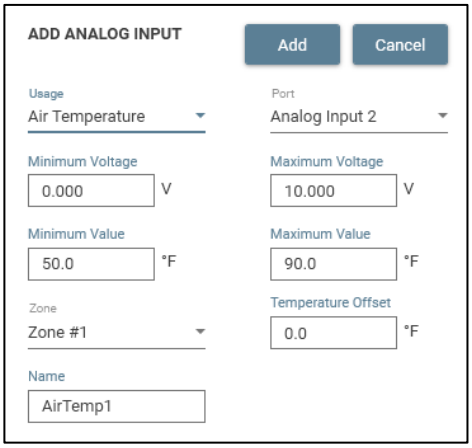



### Discharge Air Temperature (DAT)

DAT temperature is used to monitor or control the air temperature in the duct after the reheat device. When using temperature control with DAT limits, this reading is used for control purposes.

The following settings are available if the Usage is **DAT**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to PACE. |
| Zone | Zone #1<br>Zone #2<br>Zone #3 | Assigns the DAT to either Zone #1, #2 or #3.<br><br>**NOTE:** The number of zones available will change depending on how many temperature zones are configured. See the Temperature Zones menu for more information on creating temperature zones. |
| Temperature Offset | No Limits | Allows the user to adjust the temperature reading to match a reading from a balancer or commissioning agent. Applies a fixed offset to the room temperature reading. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

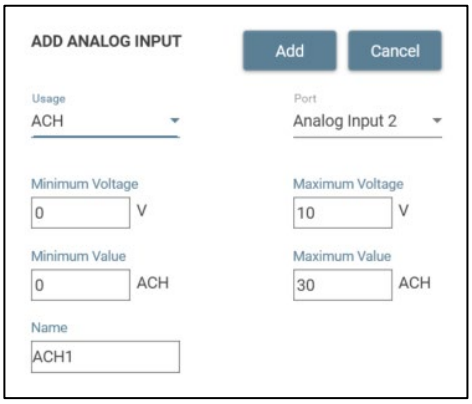



### Air Temperature

Air temperature inputs are not used in the control for the room, but can be used to monitor air temperature. This may be useful if the entering air temperature to the reheat device is required for monitoring.

The following settings are available if the Usage is **Air Temperature**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Zone | Zone #1<br>Zone #2<br>Zone #3 | Assigns the Temperature Setpoint input to control the setpoint in either Zone #1, #2 or #3.<br><br>**NOTE:** The number of zones available will change depending on how many temperature zones are configured. See the Temperature Zones menu for more information on creating temperature zones. |
| Temperature Offset | No Limits | Allows the user to adjust the temperature reading to match a reading from a balancer or commissioning agent. Applies a fixed offset to the room temperature reading. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

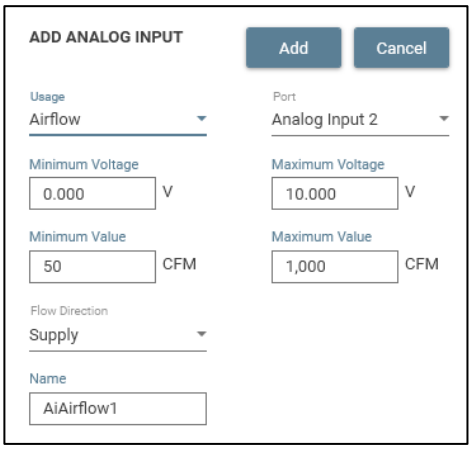



### Air Changes per Hour (ACH)

An ACH demand input is required to configure the room for Demand Control Ventilation (DCV). This is not an ACH calculation for the room.

The following settings are available if the Usage is **ACH**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |




### Airflow

An Airflow input is typically used when PACE requires the airflow of a valve controlled by others for total airflow and offset calculations.

The following settings are available if the Usage is **Airflow**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. The voltage range entered here must match the voltage range for the device providing the signal voltage to the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. The value range entered here must match the value range for the device providing the signal voltage to the PACE. |
| Flow Direction | Exhaust<br>Supply | Flow direction of the valve monitored by the PACE. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |


### Voltage

A Voltage input is typically used when PACE is required to monitor a generic voltage input. This may be used if a voltage usage is not supported by PACE, but requires to be monitored by the facility on BACnet.

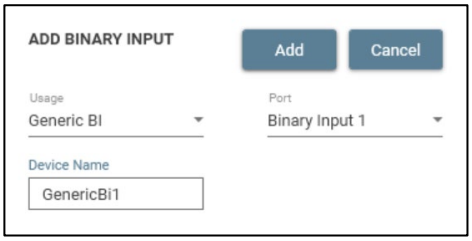
The following settings are available if the Usage is **Voltage**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Input 1<br>Analog Input 2<br>Analog Input 3<br>Analog Input 4 | Choose the Analog Input port where the device is physically wired to the PACE. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

## Binary Inputs

This section details configuration instructions and available settings for binary inputs including generic binary inputs, dual flow setpoint switches, room mode switches, indicators, door contact switches and add static flows.

**NOTE:** A maximum of two binary inputs are configurable per PACE.

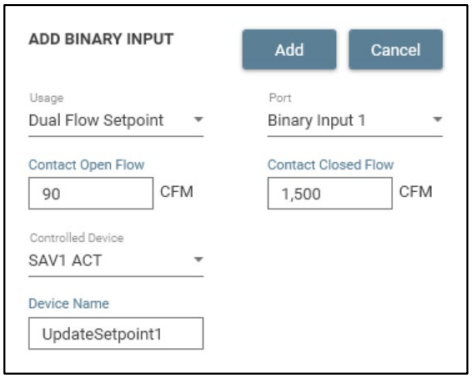



**Generic BI**

Generic BI does not have any control functionality in the room's operation, but can be used to monitor external devices such as pressure switches to trigger alarms on BACnet or in the room.

The following settings are available if the Usage is **Generic BI**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Input 1<br>Binary Input 2 | Choose the Binary Input port where the device is physically wired to the PACE. |
| Device Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

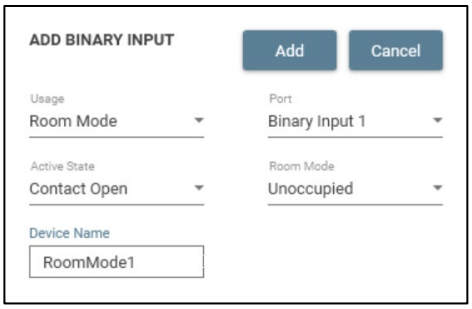



**Dual Flow Set Point**

Dual Flow Setpoint is used to control an auxiliary airflow device which has a VAV actuator and a PACE. The Binary Input will receive either a closed or open signal to change the setpoint for the auxiliary valve.

The following settings are available if the Usage is **Dual Flow Setpoint**.

| **Variable Name** | **Available Options/Range** | **Description** |
|---|---|---|
| Port | Binary Input 1<br>Binary Input 2 | Choose the Binary Input port where the device is physically wired to the PACE. |
| Contact Open Flow | Minimum to Maximum Range of Valve | Configures the flow set point when the binary input is in its open position. |
| Contact Closed Flow | Minimum to Maximum Range of Valve | Configures the flow setpoint when the binary input is in its closed state. |
| Controlled Device | Changes depending on Airflow Devices | This will be the Airflow Device that is controlled to the two different airflow setpoints.<br><br>Any airflow devices configured with an actuator that are not already associated with a Dual Flow Setpoint BI will be available from the dropdown. |
| Device Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |



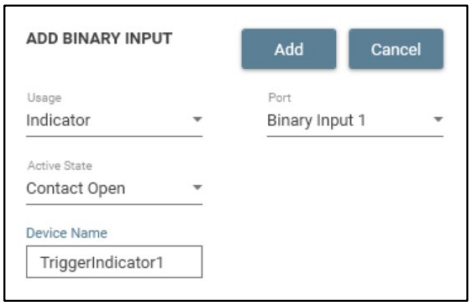

### Room Mode

The Room Mode usage is used to switch to custom room modes based on a contact closure input signal. This may include Emergency Modes or Unoccupied Modes.

The following settings are available if the Usage is **Room Mode**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Input 1<br>Binary Input 2 | Choose the Binary Input port where the device is physically wired to the PACE. |
| Active State | Contact Open | When Active State is configured to Contact Open, an open contact will trigger a change in room mode. |
| | Contact Closed | When Active State is configured to Contact Closed, a closed contact will trigger a change in room mode. |
| Room Mode | All room modes configured in the room mode manger menu (Excluding the Default Room Mode) | Sets the room mode that is activated when the binary input is in its active state. |
| Device Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The room mode to be configured for the input must first be created in the Room Mode Manager before it will be available for selection.



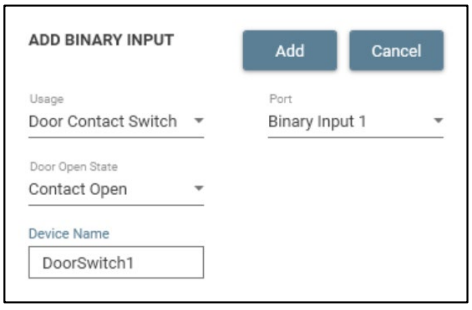

### Indicator

The Indicator binary input is used to trigger an indicator based on a contact closure input.

The following settings are available if the Usage is **Indicator**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Input 1<br>Binary Input 2 | Choose the Binary Input port where the device is physically wired to the PACE. |
| Active State | Contact Open | When Active State is configured to Contact Open, an open contact will trigger the indicator. |
| | Contact Closed | When Active State is configured to Contact Closed, a closed contact will trigger the indicator. |
| Device Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The indicator needs to be configured in the Indicators page previous to configuring the binary input. This is to establish which room modes the user would like the binary input to be active in.

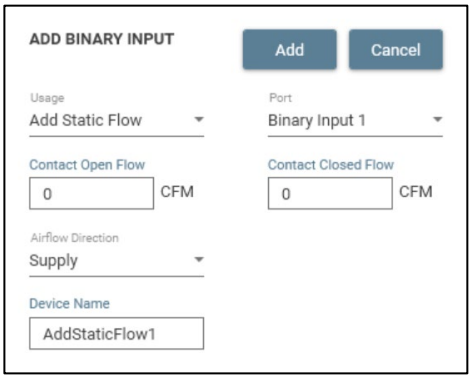



### Door Contact Switch

Door Contact Switches can be used to monitor whether a door is open or closed. When a door contact switch is configured in conjunction with pressure control, the PID control will be paused while the door is open. If only used for monitoring, the door can also trigger an indicator if it is left open for too long.

The following settings are available if the Usage is **Door Contact Switch**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Input 1<br>Binary Input 2 | Choose the Binary Input port where the device is physically wired to the PACE. |
| Door Open State | Contact Open | When Door Open State is configured to Contact Open, an open contact will signal an Open Door. |
| | Contact Closed | When Door Open State is configured to Contact Closed, a closed contact will signal an Open Door. |
| Device Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |




**Add Static Flow**

Add Static Flow is used with an auxiliary airflow device that has a 2-position actuator but no PACE. The static flow binary input adds a set amount of airflow to the room's total flow calculation based on the contact closure.

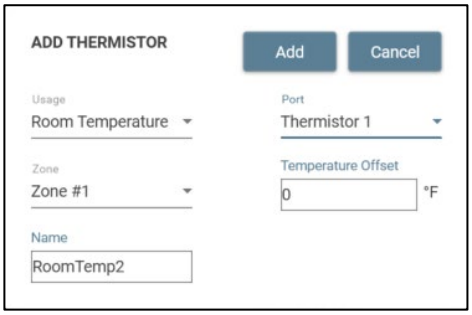
The following settings are available if the Usage is **Add Static Flow**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Input 1<br>Binary Input 2 | Choose the Binary Input port where the device is physically wired to the PACE. |
| Contact Open Flow | Minimum to Maximum Range of Valve | Configures the airflow setpoint when the binary input is in its open state. |
| Contact Closed Flow | Minimum to Maximum Range of Valve | Configures the airflow setpoint when the binary input is in its closed position. |
| Airflow Direction | Exhaust<br>Supply | Airflow direction of the auxiliary valve |
| Device Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

## Thermistors

This section details configuration instructions and available settings for thermistor inputs including room temperature, DAT and air temperature.

**NOTE:** A maximum of two thermistor inputs are configurable per PACE.

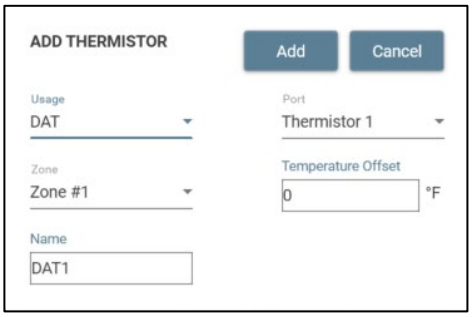



**Room Temperature**

This room temperature reading is used in the temperature control sequence for the configured temperature zone.

The following settings are available if the Usage is **Room Temperature**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Thermistor 1<br>Thermistor 2 | Choose the Thermistor Input port where the device is physically wired to the PACE. |
| Zone | Zone #1<br>Zone #2<br>Zone #3 | Assigns the Room Temperature input to either Zone #1, #2 or #3.<br><br>**NOTE:** The number of zones available will change depending on how many temperature zones are configured. See the Temperature Zones menu for more information on creating temperature zones. |
| Temperature Offset | No Limits | Allows the user to adjust the temperature reading to match a reading from a balancer or commissioning agent. Applies a fixed offset to the room temperature reading. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

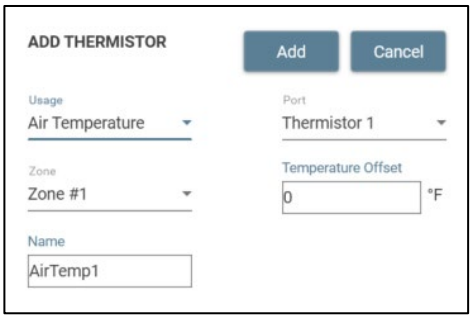



**Duct Air Temperature (DAT)**

DAT temperature is used to monitor or control the air temperature after the reheat device. When using temperature control with DAT limits, this reading is used for control purposes.

The following settings are available if the Usage is **DAT**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Thermistor 1<br>Thermistor 2 | Choose the Thermistor Input port where the device is physically wired to the PACE. |
| Zone | Zone #1<br>Zone #2<br>Zone #3 | Assigns the DAT to either Zone #1, #2 or #3.<br><br>**NOTE:** The number of zones available will change depending on how many temperature zones are configured. See the Temperature Zones menu for more information on creating temperature zones. |
| Temperature Offset | No Limits | Allows the user to adjust the temperature reading to match a reading from a balancer or commissioning agent. Applies a fixed offset to the room temperature reading. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |




**Air Temperature**

Air temperature inputs are not used in the control for the room, but can be used to monitor air temperature. This may be useful if the entering air temperature to the reheat device is required for monitoring.

The following settings are available if the Usage is **Air Temperature**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Thermistor 1<br>Thermistor 2 | Choose the Thermistor Input port where the device is physically wired to the PACE. |
| Zone | Zone #1<br>Zone #2<br>Zone #3 | Assigns the Air Temperature to either Zone #1, #2 or #3.<br><br>**NOTE:** The number of zones available will change depending on how many temperature zones are configured. See the Temperature Zones menu for more information on creating temperature zones. |
| Temperature Offset | No Limits | Allows the user to adjust the temperature reading to match a reading from a balancer or commissioning agent. Applies a fixed offset to the room temperature reading. |
| Name | 19 Characters | Assigns a name to this input.<br><br>**NOTE:** This name will display in the BACnet object name. |

## Analog Outputs

This section details configuration instructions and available settings for analog outputs including supply and exhaust actuator, reheat, room pressure, valve pressure, valve airflow and cooling devices.

**NOTE:** A maximum of four analog outputs are configurable per PACE.

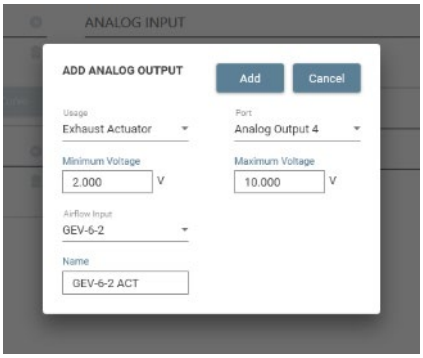

**Supply Actuator**

The Supply Actuator output is used to control the supply airflow device to meet the target airflow setpoint.

The following settings are available if the Usage is **Supply Actuator**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Output 1<br>Analog Output 2<br>Analog Output 3<br>Analog Output 4 | Choose the Analog Output port where the device is physically wired to the PACE. |
| Airflow Input | Supply airflow devices configured on same PACE | Set the airflow device that this actuator is meant to control.<br><br>**NOTE:** When using triple venturi valves, there are two actuators and two airflow devices. Make sure the actuator being configured is set to control the correct valve in the assembly. |
| Minimum/Maximum Voltage | 0 to 10 Volts | Sets the range of voltage of the actuator.<br><br>**NOTE:** The Belimo actuators used by Antec Controls have a 2-10 VDC range. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The Supply Actuator option is disabled and cannot be selected when an exhaust valve is configured in the airflow device menu.



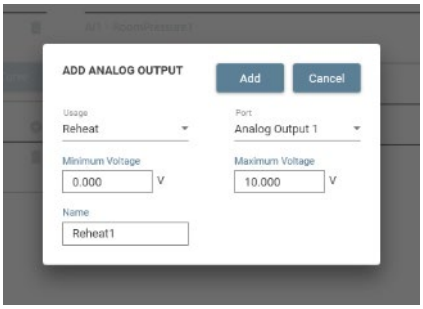

**Exhaust Actuator**

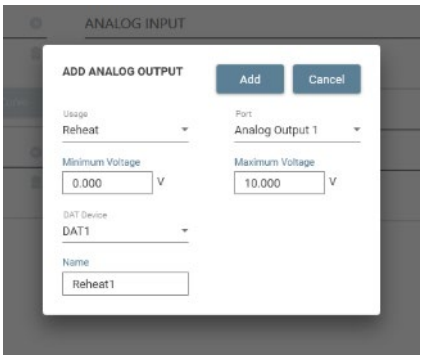
The Exhaust Actuator output is used to control the exhaust airflow device to meet the target airflow setpoint.

The following settings are available if the Usage is **Exhaust Actuator**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Output 1<br>Analog Output 2<br>Analog Output 3<br>Analog Output 4 | Choose the Analog Output port where the device is physically wired to PACE. |
| Airflow Input | Exhaust airflow devices configured on the same PACE. | Allows user to set which valve the actuator is attached to. |
| Minimum/Maximum Voltage | 0 to 10 Volts | Sets the range of voltage of the actuator.<br><br>**NOTE:** The Belimo actuators used by Antec Controls have a 2-10 VDC range. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The Exhaust Actuator option is disabled and cannot be selected when a supply valve is configured in the airflow device menu.



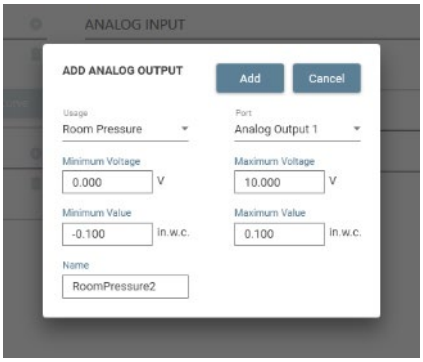

### Reheat

Reheat devices are primarily used to control Electric Coils or Hot Water Coils, but can be used for any analog heating device.

The following settings are available if the Usage is **Reheat**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Output 1<br>Analog Output 2<br>Analog Output 3<br>Analog Output 4 | Choose the Analog Output port where the device is physically wired to the PACE. |
| Minimum/Maximum Voltage | 0 to 10 Volts | Sets the range of voltage of the heating device.<br><br>**NOTE:** Check the reheat actuator specifications to input the correct voltage range. |
| DAT Device | DAT Inputs configured on PACE | When using Space Temperature Control w/ DAT Limits, the Reheat Output must be associated with a DAT Input.<br><br>**CAUTION**<br><br>It is recommended that the Space Temperature Control w/ DAT Limits sequence is configured prior to the Reheat Analog Output. If the sequence is changed after the Output is configured, the user will have to reconfigure the Reheat Output. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** When using firmware version v1.1.0 or earlier, the room will be limited to a maximum of five Heating/Cooling output devices.

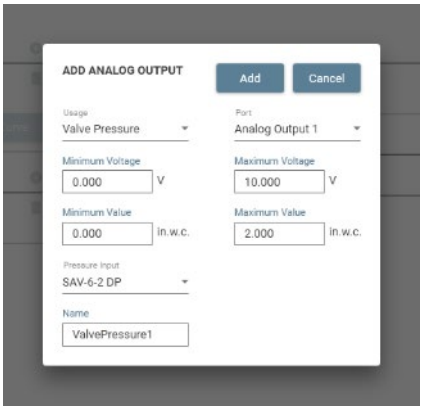



### Room Pressure

Used to output the current room pressure reading via an analog signal. Primarily used when a 3rd party device requires a room pressure reading from PACE. For example, an Room Pressure Sensor (RPS) can be configured with PACE to measure the room pressure, this usage then outputs that reading as an analog signal.

The following settings are available if the Usage is **Room Pressure**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Output 1<br>Analog Output 2<br>Analog Output 3<br>Analog Output 4 | Choose the Analog Output port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. Ensure the voltage range entered here matches the voltage range on the device reading the signal voltage from the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. Ensure the value range entered here matches the value range for the device reading the signal voltage from the PACE. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |




### Valve Pressure

Valve Pressure can be used to output a voltage signal for the differential pressure measurement across the Venturi Valve. This may be used when providing the signal to a 3rd party controller.

The following settings are available if the Usage is **Valve Pressure**.

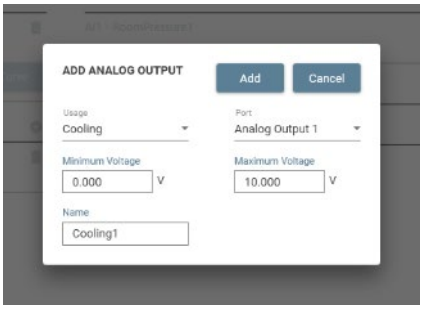
| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Output 1<br>Analog Output 2<br>Analog Output 3<br>Analog Output 4 | Choose the Analog Output port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. Ensure the voltage range entered here matches the voltage range on the device reading the signal voltage from the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. Ensure the value range entered here matches the value range for the device reading the signal voltage from the PACE. |
| Pressure Input | All Venturi Valve pressure devices on RIN | Selects valve pressure measurement to which the output is linked. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

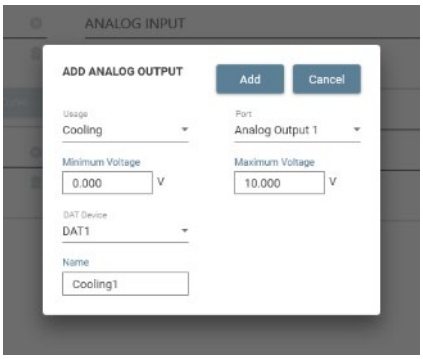

### Valve Airflow

Valve Airflow can be used to output a voltage signal for current airflow reading from a valve on the RIN network. This may be used when providing the signal to a 3rd party controller.

The following settings are available if the Usage is **Valve Airflow**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Output 1<br>Analog Output 2<br>Analog Output 3<br>Analog Output 4 | Choose the Analog Output port where the device is physically wired to the PACE. |
| Maximum/Minimum Voltage | 0 to 10 Volts | Sets the minimum and maximum voltage range. Ensure the voltage range entered here matches the voltage range on the device reading the signal voltage from the PACE. |
| Maximum/Minimum Value | Range of Sensor | Sets the minimum and maximum value. Ensure the value range entered here matches the value range for the device reading the signal voltage from the PACE. |
| Airflow Input | All Airflow Devices on RIN | Selects valve airflow measurement to which the output is linked. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |




**Cooling**

Cooling devices are primarily used to control cooling coils.

The following settings are available if the Usage is **Cooling**.

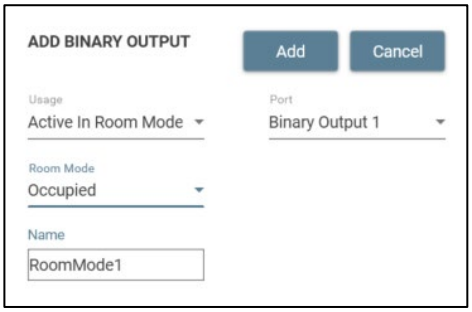
| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Analog Output 1<br>Analog Output 2<br>Analog Output 3<br>Analog Output 4 | Choose the Analog Output port where the device is physically wired to the PACE. |
| Minimum/Maximum Voltage | 0 to 10 Volts | Sets the range of voltage of the cooling device.<br><br>**NOTE:** Check the cooling actuator specifications to input the correct voltage range. |
| DAT Device | DAT Inputs configured on PACE | When using Space Temperature Control w/ DAT Limits, the Cooling Output must be associated with a DAT Input.<br><br>**CAUTION**<br><br>It is recommended that the Space Temperature Control w/ DAT Limits sequence is configured prior to the Cooling Analog Output. If the sequence is changed after the Output is configured, the user will have to reconfigure the Cooling Output. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** When using firmware version v1.1.0 or earlier, the room will be limited to a maximum of five Heating/Cooling output devices.

## Binary Outputs

This section details configuration instructions and available settings for binary output devices including room mode, indicator, invert and follow binary input and activate above and below analog thresholds.

**NOTE:** A maximum of two binary outputs can be configured per PACE.



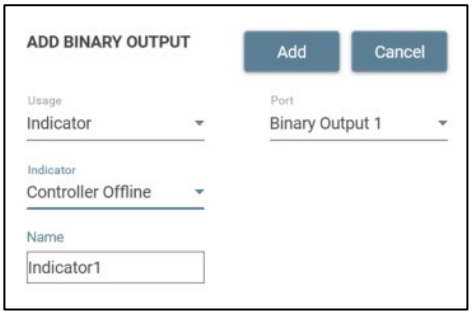

### Active in Room Mode

Active in Room Mode will trigger the binary output on the selected PACE when in a particular room mode.

The following settings are available if the Usage is **Active in Room Mode**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Output 1<br>Binary Output 2 | Choose the Binary Output port where the device is physically wired to the PACE. |
| Room Mode | All room modes configured in the room mode manger menu | Sets the room mode that triggers an active signal on the binary output. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The room mode to be configured for the output must first be created in the Room Mode Manager before it will be available for selection.

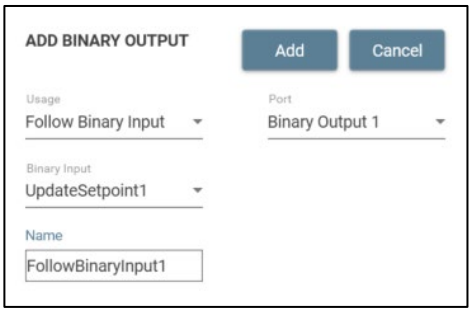



### Indicator

Indicator will activate the binary output when the selected indicator is triggered. This may be used for a hard-wired signal to a 3rd party alarming system, or to trigger an indicator in the room.

The following settings are available if the Usage is **Indicator**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Output 1<br>Binary Output 2 | Choose the Binary Output port where the device is physically wired to the PACE. |
| Indicator | All indicators | Sets the indicator that triggers an active signal from the binary output. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |



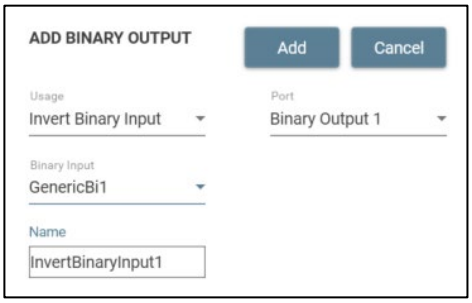

### Follow Binary Input

Follow Binary Input will activate when the configured binary input is in the open state, and deactivate when the configured binary input is in the closed state.

The following settings are available if the Usage is **Follow Binary Input**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Output 1<br>Binary Output 2 | Choose the Binary Output port where the device is physically wired to the PACE. |
| Binary Input | All configured binary inputs | Sets the binary input that the binary output will follow. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The binary input to be configured for the output must first be configured in the PACE Manager menu before it will be available for selection.



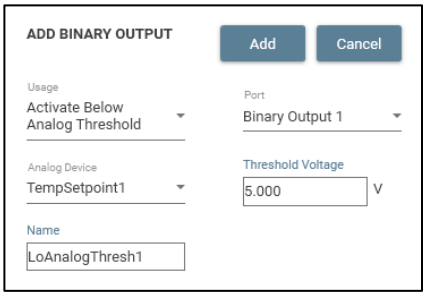

### Invert Binary Input

Invert Binary Input will activate when a configured binary input is in the closed state, and deactivate when the configured binary input is in the open state.

The following settings are available if the Usage is **Invert Binary Input**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Output 1<br>Binary Output 2 | Choose the Binary Output port where the device is physically wired to the PACE. |
| Binary Input | All configured binary inputs | Sets the binary input that the binary output will follow. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The binary input to be configured for the output must first be configured in the PACE Manager menu before it will be available for selection.



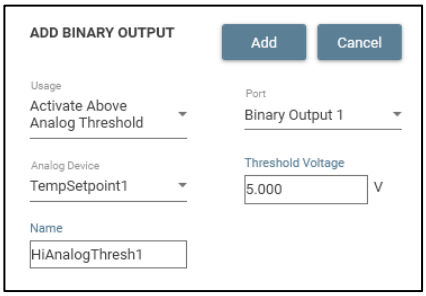

### Activate Below Analog Threshold

Used to configure a binary output to activate when the configured analog device is lower than the specified threshold voltage. This may be used for a hard-wired signal to a 3rd party alarming system, or to trigger an alarm indicator in the room.

The following settings are available if the Usage is **Activate Below Analog Threshold**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Output 1<br>Binary Output 2 | Choose the Binary Output port where the device is physically wired to the PACE. |
| Analog Device | All configured analog inputs and outputs | Sets the analog device that triggers the binary output when it is below the threshold voltage. |
| Threshold Voltage | 0 to10 Volts | If the input or output voltage drops below this value, the binary output will activate. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The analog device to be configured for the output must first be configured in the PACE Manager menu before it will be available for selection.




### Activate Above Analog Threshold

Used to configure a binary output to activate when the configured analog device is higher than the specified threshold voltage. This may be used for a hard-wired signal to a 3rd party alarming system, or to trigger an alarm indicator in the room.

The following settings are available if the Usage is **Activate Above Analog Threshold**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Port | Binary Output 1<br>Binary Output 2 | Sets the port that corresponds to the activate above AI threshold wiring to the PACE. |
| Analog Device | All configured analog inputs and outputs | Sets the analog device that triggers the binary output when it is above the threshold voltage. |
| Threshold Voltage | 0 to 10 Volts | If the input or output voltage rises above this value, the binary output will activate. |
| Name | 19 Characters | Assigns a name to this output.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** The analog device input to be configured for the output must first be configured in the PACE Manager menu before it will be available for selection.

## Sensor Information Network (SIN) Devices

The SIN menu is used to configure SIN devices for the selected PACE. Up to three SIN devices can be added to a SIN network in a room.

**NOTE:** To modify a SIN device, the SIN network must be added using the Network Menu. Once connected, any Room Pressure Sensors that are detected will appear underneath SIN devices.


**SIN Device**

After the SIN device(s) have been discovered on the network, the user will be able to choose the functionality for each of the devices that were discovered.

The following settings are available for each SIN device on the network.

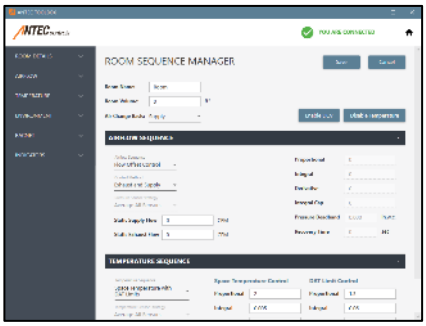
| Variable Name | Available Options/Range | Description |
|---|---|---|
| MAC Address | Read Only | Displays the unique MAC Address for the sensor. |
| Usage | Pressure Control<br>Pressure Monitor | Sets the functionality for the SIN device to either monitor or control room pressure. |
| Scale Factor | 0.5 to 2.0 | Scales PACE's pressure reading by a multiplication. EX: If PACE displays 0.01 in.w.c. and TAB measured 0.011 in.w.c., set the scale to 1.1<br><br>**NOTE:** This should be the primary balancing tool. |
| Offset | -0.005 to +0.005 in.w.c. | Offsets PACE's pressure reading by a set increment. EX: If PACE displays 0.00 in.w.c. and TAB measures -0.002 in.w.c., set the offset to -0.002 in.w.c..<br><br>**NOTE:** This should be a secondary balancing tool. |
| Name | 19 Characters | Assigns a name to this SIN device.<br><br>**NOTE:** This name will display in the BACnet object name. |

**NOTE:** When using more than one SIN device for Room Pressure measurement, configuring the use of all three readings is done in the Airflow Sequence section of the Room Sequence Manager page.

## Room Sequence Manager

The room sequence manager allows the user to set the high level airflow and temperature sequences in a room.

### General Settings



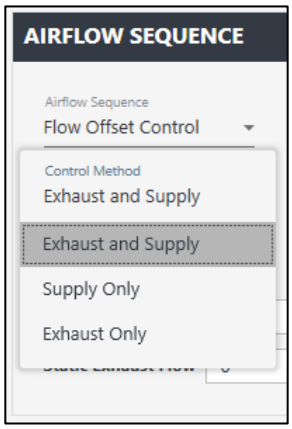

**General Settings**

Configures the general room settings.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Room Name | 19 characters | Allows the user to set the name of the room.<br><br>**NOTE:** The name will appear as the controller's name when discovered on BACnet. |
| Room Volume | 0 to 32,767 $ft^3$<br>0 to 928 $m^3$ | Allows the user to set the volume of the room. The volume is used to calculate the air changes per hour (ACH) for the room.<br><br>**NOTE:** If performing a DCV sequence, the room volume must be entered. |
| Air Change Basis | Supply<br>Exhaust | Allows the user to select the airflow direction that will be used to calculate the ACH value for the room.<br><br>**NOTE:** The air change basis will set the minimum and maximum flow type (supply or exhaust) to be configured in the room mode manager.<br><br>**EX:** If air change basis is set to supply, the supply flow minimum, supply heating flow maximum, supply cooling flow maximum and offset will be available for configuration. |

## Airflow Sequence

See below for descriptions of the different types of Airflow Sequences supported by PACE and how the settings will affect the room control.




**Flow Offset Control**

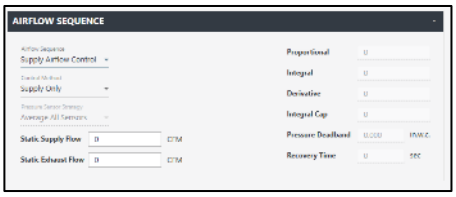
The primary controlled variable in offset flow control is the difference between the total supply air and the total exhaust air in the space. The control system is responsible for ensuring the offset is maintained at all times. Flow offset is a fast, stable solution to effectively control airflow in a critical space.

The user selects an air change basis of either supply or exhaust. The air change basis will dictate which flow direction sets the minimum required air changes in the space. After the minimum air change basis is met, the room will target the airflow offset setpoint and allows both the exhaust and supply actuators to drive to target values. Once target values have been achieved, the room uses its control method to maintain target values.

**EX:** If exhaust is selected as the air change basis, the exhaust flow minimum and exhaust heat/cooling flow maximum will have to be set in the Room Mode Manager.

The following settings are available when the Airflow Sequence is **Flow Offset Control**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Control Method | Exhaust and Supply | The exhaust will modulate to maintain the room's airflow offset setpoint. If the exhaust reaches its control limit, then the supply valves will modulate to maintain the room offset.<br>Additionally, for temperature control the user enters a heating maximum and cooling maximum based on the air change basis. The supply valves will modulate further open to meet temperature demand to a maximum of the heating or cooling max, as required.<br><br>**NOTE:** Setting the air change basis is critical for the direction of the room flow minimum in the Room Mode Manager. |
| | Supply Only | The supply will modulate to maintain the room's airflow offset setpoint. The user enters a heating maximum and cooling maximum based on the air change basis. The supply valves will modulate further open to meet temperature demand to a maximum of the heating or cooling max, as required.<br><br>**CAUTION**<br>In the case that the supply has reached its control limit, a capacity error will be displayed. |
| | Exhaust Only | The exhaust will modulate to maintain the room's airflow offset setpoint. The user enters a heating maximum and cooling maximum based on the air change basis. The supply valves will modulate further open to meet temperature demand to a maximum of the heating or cooling max, as required.<br><br>**CAUTION**<br>In the case that the exhaust has reached its control limit, a capacity error will be displayed. |
| Static Supply Flow | No Limits | Enter any supply flow that is coming from an uncontrolled, unmonitored source |
| Static Exhaust Flow | No Limits | Enter any exhaust flow that is coming from an uncontrolled, unmonitored source |



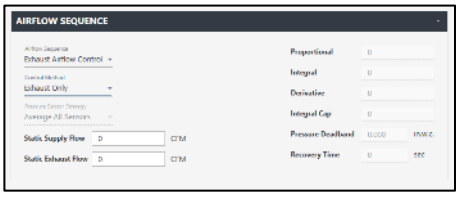

### Supply Airflow Control

The supply airflow control sequence allows the user to configure a room in which PACE is the only controlling supply airflow valves. To select supply airflow control, no controlled exhaust valves can be present in the room.

The following settings are available when the Airflow Sequence is **Supply Airflow Control**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Control Method | Supply Only | The user enters a Supply Airflow setpoint that will be held at a constant value by all supply valves in the room. |
| Static Supply Flow | No Limits | Enter any supply flow that is coming from an uncontrolled, unmonitored source. |
| Static Exhaust Flow | No Limits | Enter any exhaust flow that is coming from an uncontrolled, unmonitored source. |

**NOTE:** Supply airflow control limits the air change basis to supply.



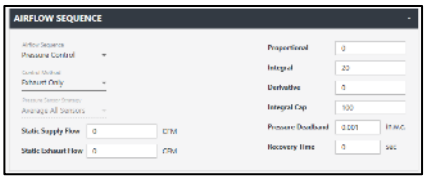

### Exhaust Airflow Control

The exhaust airflow control sequence allows the user to configure a room in which PACE is the only controller exhaust airflow valves. To select exhaust airflow control, no controlled supply valves can be present in the room.

The following settings are available when the Airflow Sequence is **Exhaust Airflow Control**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Control Method | Exhaust Only | The user enters an Exhaust Airflow setpoint that will be held at a constant value by all exhaust valves in the room. |
| Static Supply Flow | No Limits | Enter any supply flow that is coming from an uncontrolled, unmonitored source. |
| Static Exhaust Flow | No Limits | Enter any exhaust flow that is coming from an uncontrolled, unmonitored source. |

**NOTE:** Exhaust airflow control limits the air change basis to exhaust.




**Pressure Control**

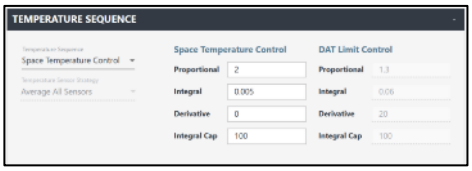
The primary controlled variable in pressure control is the pressure differential between the controlled room and an adjacent space. Pressure control requires a room pressure reading through SIN or an analog input. The control system is responsible for ensuring the pressure is maintained at all times. Pressure control typically requires tuning, but is capable of accurately controlling to a target room pressure.

The following settings are available when the Airflow Sequence is **Pressure Control**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Control Method | Supply Only | The user enters a fixed Exhaust Airflow setpoint. The supply will modulate to maintain room pressure.<br><br>**NOTE:** Supply only pressure control limits the air change basis to the exhaust. |
| | Exhaust Only | The user enters a fixed Supply Airflow setpoint. The exhaust will modulate to maintain room pressure.<br><br>**NOTE:** Exhaust only pressure control limits the air change basis to the supply. |
| Static Supply Flow | No Limits | Enter any supply flow that is coming from an uncontrolled, unmonitored source. |
| Static Exhaust Flow | No Limits | Enter any exhaust flow that is coming from an uncontrolled, unmonitored source. |
| Pressure Sensor Strategy | Average sensors<br>Use lowest<br>Use highest | When using multiple room pressure sensors, the user can choose to average all readings, use the lowest reading or use the highest reading.<br><br>**NOTE:** BACnet will only display one reading for the Room Pressure based on the selected value for the Pressure Sensor Strategy. |
| PID Pressure Control | | The PID pressure control settings allows the user to adjust proportional, integral, integral cap and derivative values. |
| Pressure Deadband | No Limits | Allows the user to adjust the deadband where the room pressure will be considered satisfied. No adjustments will be made to the airflow as long as the pressure remains in the deadband. |
| Recovery Time | No Limits | If door switches are installed, they will freeze the PID control when the door is open.<br>Recovery time is the time from when the door is closed to when the PID control will re-engage. |

## Temperature Sequence

See below for a description of the two temperature sequences available when working with PACE.




### Space Temperature Control

Space temperature control uses room temperature readings and responds accordingly based on the PID settings. Temperature in most spaces can be controlled successfully with this temperature sequence.

The following settings are available when the using **Space Temperature Control**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Temperature Sensor Strategy | Average All Sensors<br>Use Lowest<br>Use Highest | The temperature sensor strategy appears when multiple room temperature readings are present in a single temperature zone. It allows the user to select how the room temperature for each zone is calculated and how to use the multiple readings in the temperature control algorithm. |
| Space Temp. Control (PID) | | The space temperature control PID settings allows the user to adjust proportional, integral, integral cap and derivative values. |


### Space Temperature with DAT Limits

Space temperature control with DAT limits utilizes room temperature readings in conjunction with control of the DAT. As more or less heating is required in the space, the DAT target will raise or lower and the reheat will adjust to meet the DAT target within the acceptable limits set for each room mode. This temperature control method can provide increased stability and is useful in rooms with high air changes per hour (ex: >20 ACH)

The following settings are available when the using **Space Temperature with DAT Limits**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Temperature Sensor Strategy | | The temperature sensor strategy appears when multiple room temperature readings are present in a single temperature zone. It allows the user to select how the room temperature for each zone is calculated and how to use the multiple readings in the temperature control algorithm. |
| Space Temp. Control (PID) | | The space temperature control PID settings allows the user to adjust proportional, integral, integral cap and derivative values. |
| DAT Temp. Limit Control (PID) | | The discharge air temperature limit control PID settings allows the user to adjust proportional, integral, integral cap and derivative values. |

## Demand Control Ventilation (DCV) Sequence

See below for a description of the DCV sequencing and available options.


**Demand Control Ventilation (DCV)**

Demand control ventilation utilizes an ACH demand to ensure that contamination in the room remains within acceptable standards. Typically, labs with these systems are allowed to operate down to 2 ACH. If contaminants in the room are detected, a demand signal will be provided to PACE to increase the ACH in the room. If this demand exceeds the current temperature demand, then the airflow in the space will be increased to match the DCV's ACH demand.

The following settings are available when the **DCV** has been enabled.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| ACH Target Source | All configured ACH inputs | The user can select from any analog inputs that have been configured for the ACH usage. |

**NOTE:** To use the DCV sequence a room volume must be entered in the Room Sequence Manager.

## Room Mode Manager

Room modes can be used to command the room into different states of operation where different airflow or temperature setpoints are required. Examples would include, but are not limited to Occupied, Unoccupied and Emergency modes.

### Types of Room Modes

There are two main types of room modes:

**Default Room Mode:** Toolbox creates the default room mode the first time a user connects to PACE. The default room mode is meant for the basic operation of the room and will populate based on some general information contained in the linestrings for all the valves in the room. The default room mode is the lowest priority room mode. PACE will only operate in this mode if no other room mode is currently activated.

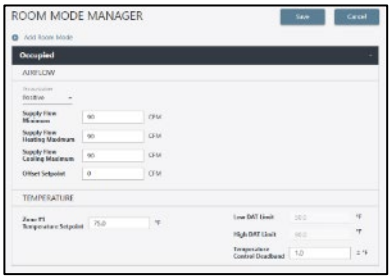
**User Created Room Modes:** The user has the ability to create up to five custom room modes. This allows the user to customize room modes that may require different airflow or temperature control setpoints for different control conditions in the space. The most common applications would be Unoccupied or Emergency modes.

**NOTE:** Users may create up to five User Created Room Modes.

### Airflow

See below for the available settings when configuring the airflow setpoints for the Default Room Mode and any User Created Room Modes.

**NOTE:** Available settings change based on previously selected settings, see below for a description of the settings available for different scenarios.

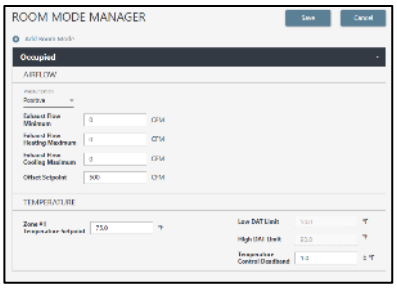



**Flow Offset Control with Supply ACH Basis**

The supply will be used to dictate the ACH in the room. The user will provide supply flow setpoints for the room's operation.

The following settings are available with **Flow Offset Control** and **Supply ACH Basis**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Pressurization | Positive<br>Negative | Set either a negative or positive room pressurization. |
| Supply Flow Minimum | Minimum to Maximum Range of Valve | The minimum scheduled supply flow allowed in the space to maintain the necessary air changes for this room mode. |
| Supply Flow Heating Maximum | *Supply Flow Minimum* to Maximum Range of Valve | The maximum scheduled supply heating flow allowed in the space to maintain temperature demand. |
| Supply Flow Cooling Maximum | *Supply Flow Minimum* to Maximum Range of Valve | The maximum scheduled supply cooling flow allowed in the space to maintain temperature demand. |
| Room Offset Setpoint | No Limits | The fixed offset between the supply and exhaust flows. As the supply modulates between its Minimum and Maximum, the exhaust will track to maintain this fixed offset.<br><br>**NOTE:** This value is always entered as a positive number. The Pressurization dropdown will select whether the exhaust will offset with a higher or lower value than the supply. |

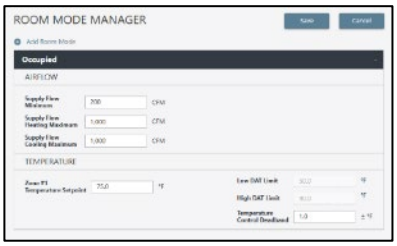



### Flow Offset Control with Exhaust ACH Basis

The exhaust will be used to dictate the ACH in the room. The user will provide exhaust flow setpoints for the room's operation.

The following settings are available with **Flow Offset Control** and **Exhaust ACH Basis**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Pressurization | Positive<br>Negative | Set either a negative or positive room pressurization. |
| Exhaust Flow Minimum | Minimum to Maximum Range of Valve | The minimum scheduled exhaust flow allowed out of the space to maintain the necessary air changes for this room mode. |
| Exhaust Flow Heating Maximum | *Exhaust Flow Minimum* to Maximum Range of Valve | The maximum scheduled exhaust heating flow allowed in the space to maintain temperature demand. |
| Exhaust Flow Cooling Maximum | *Exhaust Flow Minimum* to Maximum Range of Valve | The maximum scheduled exhaust cooling flow allowed in the space to maintain temperature demand. |
| Room Offset Setpoint | No Limits | The fixed offset between the supply and exhaust flows. As the exhaust modulates between its Minimum and Maximum, the supply will track to maintain this fixed offset.<br><br>**NOTE:** This value is always entered as a positive number. The Pressurization dropdown will dictate whether the exhaust will offset with a higher or lower value than the supply. |

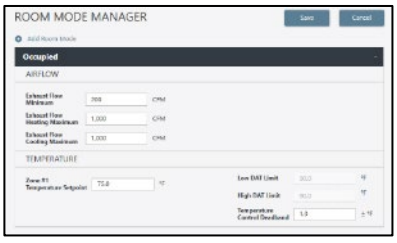



### Supply Airflow Control

The supply will be used to dictate the ACH in the room. The user will provide supply flow setpoints for the room's operation.

The following settings are available with **Supply Airflow Control**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Supply Flow Minimum | Minimum to Maximum Range of Valve | The minimum scheduled supply flow allowed in the space to maintain the necessary air changes for this room mode. |
| Supply Flow Heating Maximum | *Supply Flow Minimum* to Maximum Range of Valve | The maximum scheduled supply heating flow allowed in the space to maintain temperature demand. |
| Supply Flow Cooling Maximum | *Supply Flow Minimum* to Maximum Range of Valve | The maximum scheduled supply cooling flow allowed in the space to maintain temperature demand. |

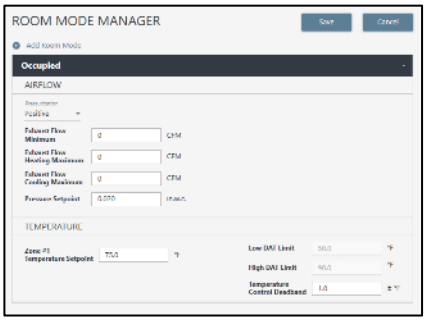



### Exhaust Airflow Control

The exhaust will be used to dictate the ACH in the room. The user will provide exhaust flow setpoints for the room's operation.

The following settings are available with **Exhaust Airflow Control**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Exhaust Flow Minimum | Minimum to Maximum Range of Valve | The minimum scheduled exhaust flow allowed out of the space to maintain the necessary air changes for this room mode. |
| Exhaust Flow Heating Maximum | *Exhaust Flow Minimum* to Maximum Range of Valve | The maximum scheduled exhaust heating flow allowed in the space to maintain temperature demand. |
| Exhaust Flow Cooling Maximum | *Exhaust Flow Minimum* to Maximum Range of Valve | The maximum scheduled exhaust cooling flow allowed in the space to maintain temperature demand. |

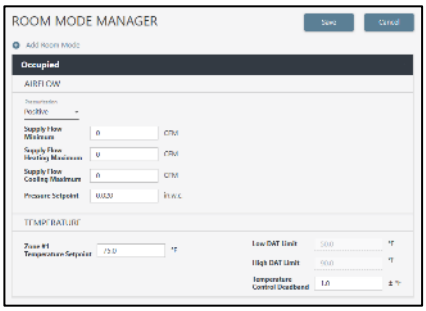



**Pressure Control with Supply ACH Basis Only**

The supply will be set to modulate for temperature demand and the user will then set a pressure setpoint for the room.

The following settings are available with **Pressure Control** with **Supply ACH Basis**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Pressurization | Positive<br>Negative | Set either a negative or positive room pressurization. |
| Supply Flow Minimum | Minimum to Maximum Range of Valve | The minimum scheduled supply flow allowed in the space to maintain the necessary air changes for this room mode. |
| Supply Flow Heating Maximum | Minimum to Maximum Range of Valve | The maximum scheduled supply heating flow allowed in the space to maintain temperature demand. |
| Supply Flow Cooling Maximum | Minimum to Maximum Range of Valve | The maximum scheduled supply cooling flow allowed in the space to maintain temperature demand. |
| Pressure Setpoint | No Limits | Sets the pressure control setpoint for the room. The exhaust valve will modulate until the room's pressure setpoint is satisfied. |




**Pressure Control with Exhaust ACH Basis**

The exhaust will be set to modulate for temperature demand and the user will then set a pressure setpoint for the room.

The following settings are available with **Pressure Control** with **Exhaust ACH Basis**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Pressurization | Positive<br>Negative | Set either a negative or positive room pressurization. |
| Exhaust Flow Minimum | Minimum to Maximum Range of Valve | The minimum scheduled exhaust flow allowed in the space to maintain the necessary air changes for this room mode. |
| Exhaust Flow Heating Maximum | Minimum to Maximum Range of Valve | The maximum scheduled exhaust heating flow allowed in the space to maintain temperature demand. |
| Exhaust Flow Cooling Maximum | Minimum to Maximum Range of Valve | The maximum scheduled exhaust cooling flow allowed in the space to maintain temperature demand. |
| Pressure Setpoint | No Limits | Sets the pressure control setpoint for the room. The supply valve will modulate until the room's pressure setpoint is satisfied. |

## Temperature

See below for the available settings when configuring the temperature setpoints for the Default Room Mode and any User Created Room Modes.


**Temperature**

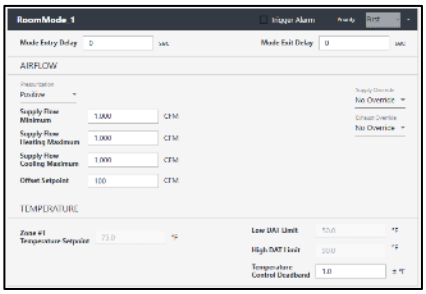
Temperature setpoints are fully customizable for any room modes. Different setpoints can be set for room modes that require tighter temperature control or a wider range of acceptable temperature control.

The following settings are available for **All Room Modes**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Zone #1 Temperature Set Point | No Limits | Allows the user to configure the temperature setpoint for Zone #1. Additional fields will be available when using multiple temperature zones.<br><br>**NOTE:** This value is only available if there is no Analog Input configured for Temperature Setpoint. |
| Low DAT Limit | No Limits (when lower than the High DAT Limit) | The DAT control will not drop below this temperature value. If further cooling is required and the DAT has already reached this limit, the coil will not provide any cooler air.<br><br>**NOTE:** Only available if Space Temperature Control w/ DAT Limits is selected. |
| High DAT Limit | No Limits (when higher than the Low DAT Limit) | The DAT control will not rise above this temperature value. If further heating is required and the DAT has already reached this limit, the coil will not provide any hotter air.<br><br>**NOTE:** Only available if Space Temperature Control w/ DAT Limits is selected. |
| Temperature Control Deadband | 0 to 10 F | Sets the deadband where the room temperature control will be considered satisfied. When in this deadband, the reheat and any added airflow will remain set in that position until heating or cooling are required.<br><br>**NOTE:** The temperature control deadband sets the amount of degrees away from the set point that the temperature control PID loop initiates. |

## Additional Features

See below for the available settings for User Created Room Modes.




**Additional Features**

The following settings are available for **User Created Room Modes**.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Room Mode Name | 19 Characters | Customizable room name for simple identification of the available room modes. Click on the name to edit the field.<br><br>**NOTE:** This field is also editable for the occupied room mode if a different name is desired to be displayed on BACnet, but it will still behave like an 'occupied' room mode. |
| Trigger Alarm | On/Off | Trigger an indicator whenever the room mode is active. |
| Priority | # of User Created Room Modes | Sets the priority of User Created Room modes if two are activated simultaneously. |
| Mode Entry Delay | No Limits | Time from when the mode input is triggered to when PACE will change to this room mode. |
| Mode Exit Delay | No Limits | Time from when the mode input is not triggered to when PACE will change to the default room mode. |
| Supply Override | Fully Open<br>Fully Closed | Forces the supply valve(s) to a full open or full closed position. |
| Exhaust Override | Fully Open<br>Fully Closed | Forces the exhaust valve(s) to a full open or full closed position. |

**NOTE:** When using Supply or Exhaust Override functions within a room mode, room offset and airflow setpoints are not maintained.

**CAUTION**

If an indicator is required for a Room Mode (i.e. for Emergency or Purge) then the Trigger Alarm option must be checked here.

## Airflow Staging

Airflow staging displays the operating airflow range of each supply or exhaust valve in the room.

In its simplest form, with only one supply and one exhaust valve, this should simply show the operating range of both valves. In larger rooms with multiple supply or exhaust valves, the airflow staging menu allows the user to stage specific supply or exhaust valves to react first in the system. The valves in each stage will move from the minimum to maximum flows set in the airflow device menu before moving onto the next stage. Usually the maximum and minimum are set to the full operating range of the valve.

**NOTE:** Fume hood exhausts will not appear in the airflow staging menu.




**Moving Valves to a New Stage**

A stage can be added in the airflow staging menu by selecting Add Stage.

Clicking the vertical arrow button next to SAV-2 ACT will open the following prompt to move the valve into a different stage.


SAV-2 will now appear underneath Stage 2 and will remain at its minimum flow until SAV-1 and SAV-3 have been fully opened.

**CAUTION**

A maximum of 10 airflow devices are allowed in a single state. If more than 10 supply or exhaust airflow devices exist on a single RIN network, valves will need to be staged.

Triple or Quad Venturi Valves are considered 2 airflow devices, and therefore count as 2 airflow devices in the airflow stage.

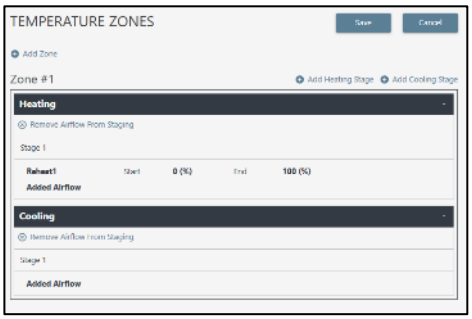
This excludes 2-P valves (with relay), 2-P valves (with PACE) and Mechanical Constant Volume VV.

**CAUTION**

Multiple airflow stages are only available if the room has only one Temperature Zone.

## Temperature Zones

Allows the user to configure the specifics of the temperature control settings, either creating multiple stages or multiple temperature zones.




**Temperature Zones**

Staging allows the user to configure reheat devices and/or additional airflow to work in synchronization or in staged response for temperature control.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Reheat | 0 to 100% | A reheat device will automatically populate in Stage 1 of the heating sequence after the user has configured an analog output for a reheat device. |
| Add Airflow to Staging | 0 to (Maximum value set in Room Mode Manager) | Added airflow can be applied to heating or cooling stages. The added airflow maximum is set for heating and cooling in the Room Mode Manager. |
| Add Heating Stage | Selection | Allows the user to add an additional heating stage. After the stage has been created, clicking the vertical arrows next to a reheat device or added airflow will allow the user to move the selection to another stage.<br><br>**NOTE:** Adding a heating stage is only available if multiple heating items are in Heating. |
| Remove Heating Stage | Selection | Removes additional heating stages. Moves all devices or airflow in that stage to Stage 1. |
| Add Cooling Stage | Selection | Allows the user to add an additional cooling stage. After the stage has been created, clicking the vertical arrows next to added airflow will allow the user to move the selection to another stage.<br><br>**NOTE:** Adding a cooling stage is only available if multiple cooling items are in Cooling. |
| Remove Cooling Stage | Selection | Removes additional cooling stages. Moves all devices or airflow in that stage to Stage 1. |
| Remove Airflow from Staging | Selection | Removes additional airflow from either heating or cooling stages. |
| Add Zone | Selection | Allows the user to add an additional temperature zone to the room.<br><br>To move devices to a new zone the location button next to the device can be selected. To add airflow to a new zone select add airflow to staging.<br><br>**NOTE:** Airflow staging cannot be implemented if an additional zone is added. |
| Remove Zone | Selection | Allows the user to remove an additional temperature zone in the room. |

**CAUTION**

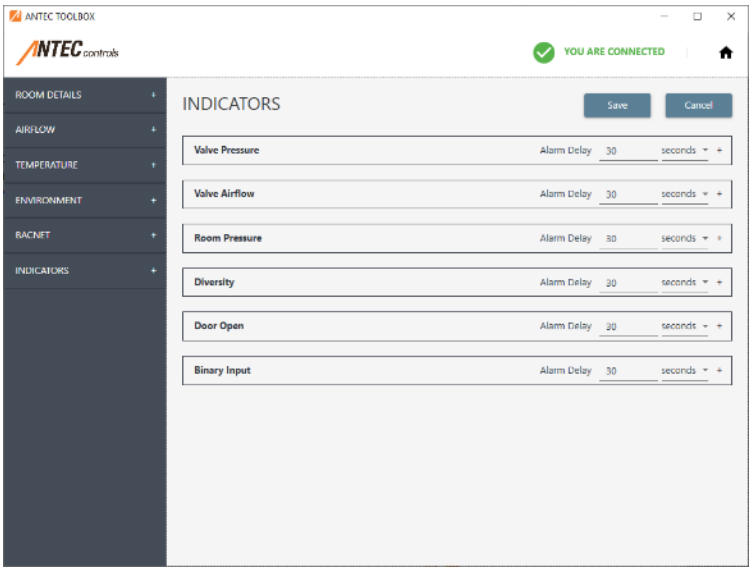
When staging devices in the temperature zones menu, all devices in Stage 1, including a reheat and added airflow, will modulate to 100% capacity or until the setpoint is reached. If the setpoint is reached before 100% is reached, the value will hold as long as the setpoint is satisfied. If the setpoint is not reached, then all devices in Stage 2 will begin to modulate until the setpoint is reached.

**CAUTION**

A maximum of 5 reheat devices are allowed in a single stage. If more than 5 reheat devices are present in a room, it is recommended that the room is divided into multiple temperature zones.

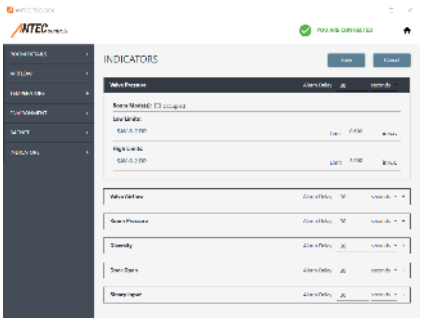
## Indicators

Indicators are also known as alarms. They typically indicate when a desired room condition is not being achieved or may indicate that there is a problem with the operating conditions in the room. These indicators will be displayed locally in Toolbox when a technician is working in the room and are also transmitted to the BAS via BACnet for remote alarming.




**CAUTION**

The Controller Offline indicator is enabled by default with a delay of 0 seconds.

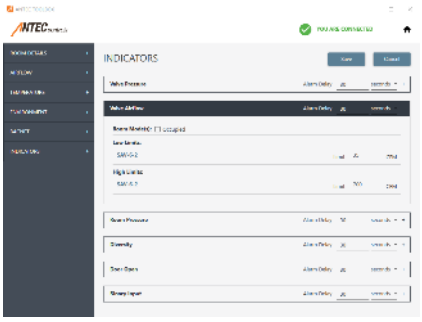


### Valve Pressure

Valve pressure indicators are recommended when using Venturi Valves as they are designed to operate within specific pressure differential ranges.

The following settings are available for **Valve Pressure** indicators.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Alarm Trigger Delay | No Limits | Time delay before the indicator becomes active. |
| Room Mode(s) | All configured room modes | Select which Room Mode the indicator will be enabled.<br><br>**NOTE:** If a room mode is not checked, the indicator will not activate. |
| Low Limits | No Limits | Sets the low limit for the indicator. Should match the low limit on the Specification label of the valve. |
| High Limits | No Limits | Sets the high limit for the indicator. Should match the high limit on the Specification label of the valve. |

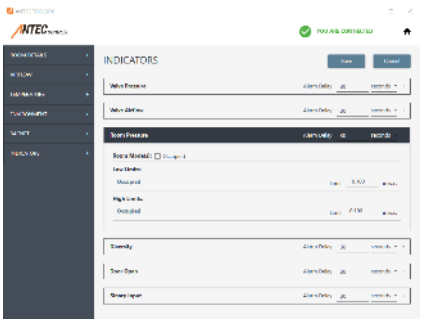


### Valve Airflow

Valve airflow indicators are recommended when using a Venturi FX Valve or a Terminal Unit.

The following settings are available for **Valve Airflow** indicators.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Alarm Trigger Delay | No Limits | Time delay before the indicator becomes active. |
| Room Mode(s) | All configured room modes | Select which Room Mode the indicator will be enabled.<br><br>**NOTE:** If a room mode is not checked, the indicator will not activate. |
| Low Limits | No Limits | Sets the low limit for the indicator. Recommended to be the scheduled minimum of the valve. |
| High Limits | No Limits | Sets the high limit for the indicator. Recommended to be the scheduled maximum of the valve. |

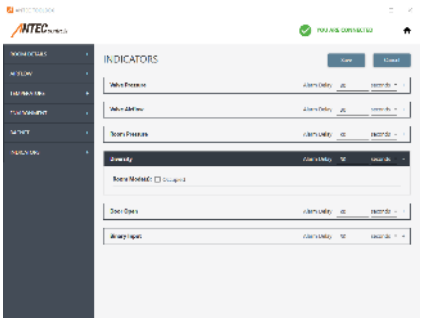


### Room Pressure

Room Pressure indicators are recommended when using pressure control or when room pressure monitoring is utilized.

The following settings are available for **Room Pressure** indicators.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Alarm Trigger Delay | No Limits | Time delay before the indicator becomes active. |
| Room Mode(s) | All configured room modes | Select which Room Mode the indicator will be enabled.<br><br>**NOTE:** If a room mode is not checked, the indicator will not activate. |
| Low Limits | No Limits | Sets the low limit for the indicator. |
| High Limits | No Limits | Sets the high limit for the indicator. |

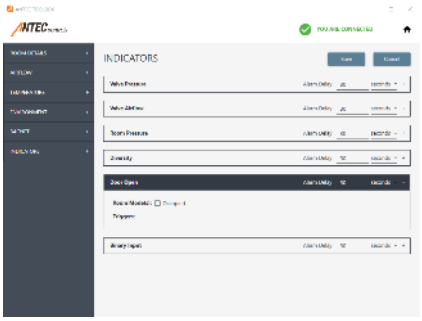


### Diversity

Diversity alarms indicate when the flow offset is not capable of being achieved based on the demand required by fume hoods. Diversity is typically only seen in large labs that may be designed to operate with only a limited portion of the hoods open at any given time.

The following settings are available for **Diversity** indicators.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Alarm Trigger Delay | No Limits | Time delay before the indicator becomes active. |
| Room Mode(s) | All configured room modes | Select which Room Mode the indicator will be enabled.<br><br>**NOTE:** If a room mode is not checked, the indicator will not activate. |

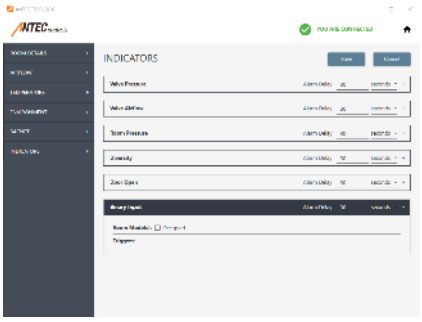


### Door Open

Door alarms are typically used when using pressure control or pressure monitoring in a room. This allows users to better understand why a room cannot maintain room pressure. Without this door alarm, a user would simply be presented with a Low Pressure Alarm, even though the true issue is that the door is left open.

The following settings are available for **Door Open** indicators.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Alarm Trigger Delay | No Limits | Time delay before the indicator becomes active. |
| Room Mode(s) | All configured room modes | Select which Room Mode the indicator will be enabled.<br><br>**NOTE:** If a room mode is not checked, the indicator will not activate. |
| Triggers | All door contact inputs | All devices capable of triggering the indicator. |



### Binary Input

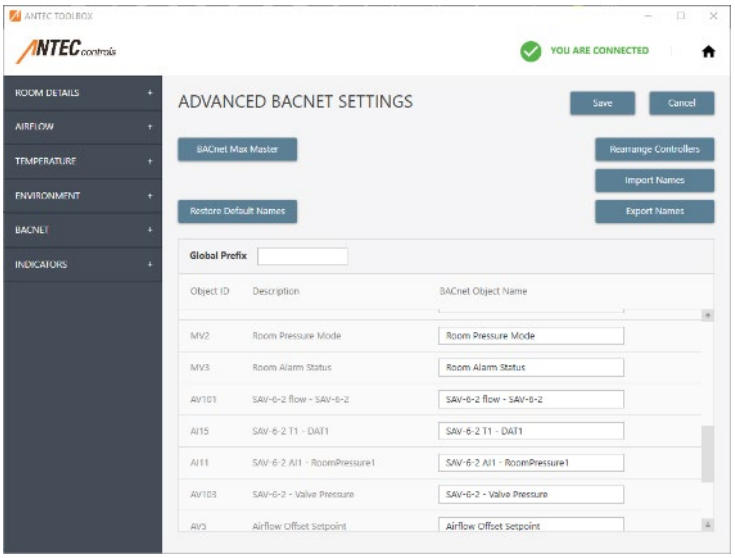
A specific binary input can be used to trigger an indicator. This may be useful if another system is sending an alarm signal to PACE.

The following settings are available for **Binary Input** indicators.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Alarm Trigger Delay | No Limits | Time delay before the indicator becomes active. |
| Room Mode(s) | All configured room modes | Select which Room Mode the indicator will be enabled.<br><br>**NOTE:** If a room mode is not checked, the indicator will not activate. |
| Triggers | All Binary Inputs | All devices capable of triggering the indicator. |

## Advanced BACnet Settings

Advanced BACnet settings allows the user to create a custom naming and numbering convention for BACnet points being sent out by PACE. This is a useful tool if a customer would like a common convention across all devices on their network.




**CAUTION**

The Advanced BACnet Settings page shows the BACnet Points list for the most up-to-date firmware release. If using the newest Toolbox version with older firmware versions, the points list shown may not match the points list available on BACnet.

### How Object numbers are created for Inputs and Outputs

| Object ID | How it is created |
|---|---|
| **AI**#1 | Based on the input/output type. **Ex:** AI11 shown above is an Analog Input. |
| AI**#**1 | The # indicates the Controller Enumeration. Every PACE on RIN is assigned a unique Enumeration based on the type of valve and the BACnet points will be assigned based on that enumeration. **Ex:** AI11 shown above is on the #1 PACE in the room.<br>Controller Enumeration is created in the following order:<br>SAV •Supply Air Valves<br>GEV •General Exhaust Valves<br>OEV •Other Exhaust Valves<br>FEV •Fume Hood Exhaust Valves |
| AI#**1** | Indicates the physical input/output being used on the associated PACE. **Ex:** AI11 shown above is using Analog Input 1. |

### How Object Names are created by default

| Object Name | How it is created |
|---|---|
| **[Pace name]** – AI1 – [AI1 Device name] | Mimics the Controller Name set in the Controller Details menu. |
| [Pace name] – AI1 – **[AI1 Device name]** | Mimics the Device Name set in the PACE Manager menu for each device. |

## Advanced BACnet Settings

**BACnet Max Master**

Limits the range over which the Poll For Master will scan on the MS/TP segment. For segments with less than 127 devices, optimizing the BACnet Max Master setting for each individual segment can increase the network efficiency.

**NOTE:** The BACnet Max Master must be configured for the highest MAC Address on the MS/TP segment.

**CAUTION**

Modifying BACnet Max Master setting could result in loss of communication with other devices on the BACnet MS/TP segment. Ensure that all devices on the MS/TP segment are configured with the same max master if it is required.

**Restore Default Names**

At any time, the points can be reverted back to the default point names.

**CAUTION**

This will cause all points to go back to defaults. Do not use this unless all points are desired to go back to defaults.

**Global Prefix**

Applies a prefix to the beginning of each BACnet Object Name

**CAUTION**

If a Global Prefix is entered and then edited in only one BACnet Point, the ability to remove the Global Prefix will be disabled.

**Rearrange Controllers**

Provides the user with the ability to modify the Controller Enumerations to reorder the Home Screen as well as the BACnet Points.

**CAUTION**

Changing the Controller Enumeration will change the order of the BACnet Points. It is not recommended to Rearrange Controllers after the BAS has been programmed.

**Import Names**

Allows the user to import a BN_NAMES.DAT file for a naming convention from another room.

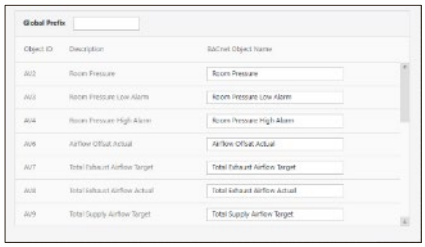
**NOTE:** This is only recommended when a project requires a very specific and consistent naming convention for the facility.

**CAUTION**

Before importing any BN_NAMES.DAT files, ensure that all valves are configured correctly and have been ordered in the same order as the valves from which the BN_NAMES.DAT file was created.

**Export Names**

Exports the BACnet names from the current room. This file can be used in other rooms when using the *Import Names* function.



**BACnet Object Name**

Displays the current BACnet object name and allows the user to adjust the name to provide unique naming to the points.

**NOTE:** Names are limited to a 39 characters.

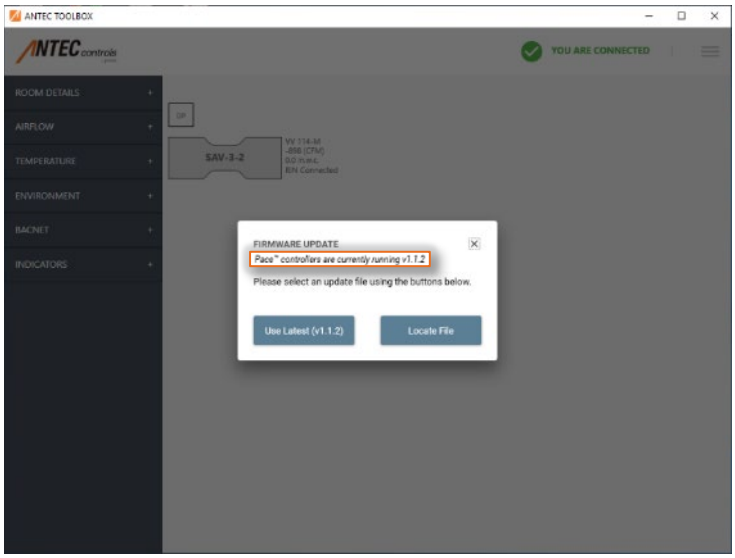
**CAUTION**

Use caution when updating BACnet point names. Changing the names to custom names may cause confusion if not done properly. When troubleshooting, always confirm the Object ID is correct to confirm the value being shown has the correct name.

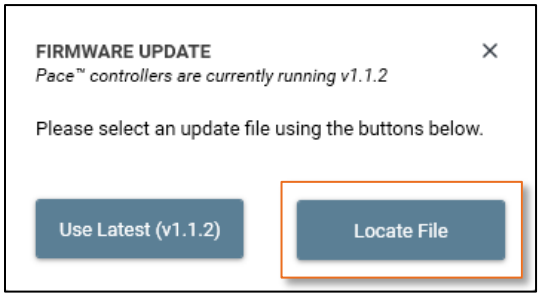
## Firmware Update

The firmware update menu allows the user to manually update the firmware for PACE controllers. The firmware will update on all PACE controllers connected on the same RIN. The firmware update menu will tell you what firmware the PACE is currently running.

**NOTE:** Toolbox will prompt the user to automatically update upon opening the program when it is not running the latest version of firmware.

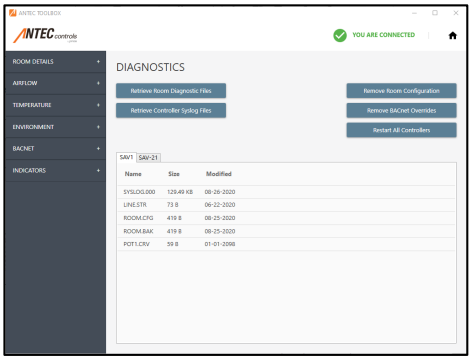


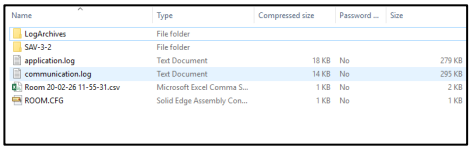

The user can use the locate file button to select a local version of firmware from their computer. If a specific version of firmware is required for a job, please contact Antec Field Support.



## Diagnostics

The Diagnostics menu allows the user to download room diagnostic files, download controller syslog files, remove room configurations, and restart all controllers.



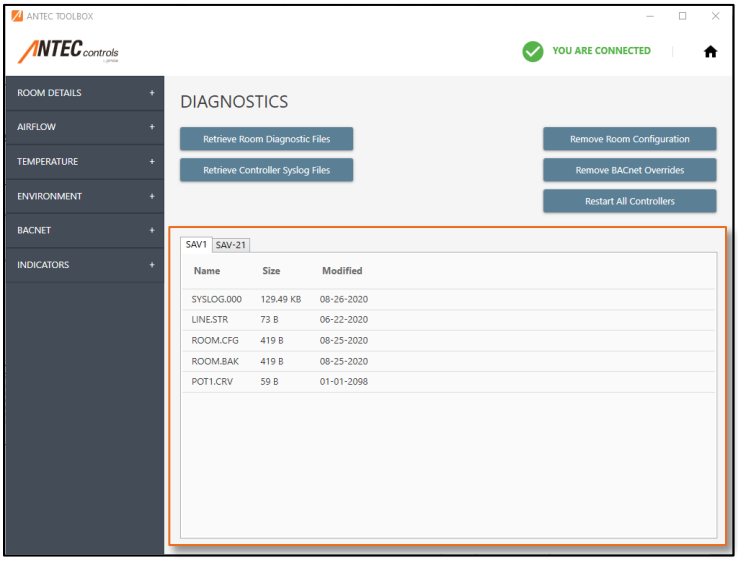

### Diagnostics

The following settings are available in the Diagnostics Menu.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Retrieve Room Diagnostic Files | | Retrieves a zip file including a log archive, valve specific files (line string, POT curve, and room configuration), application log, communication log, commissioning report, and ROOM.CFG file. The commissioning report allows the user to retrieve the valve specific configuration and room control sequences for all PACE connected on the same RIN. The ROOM.CFG file is a copy of the room configuration file. The application files log information about how Toolbox is running behind the scenes. The application files can assist the field support team with troubleshooting and diagnosing. |
| Retrieve Controller Syslog Files | | Syslog files log information about how the firmware is running for a specific PACE controller. The syslog files can assist the field support team with troubleshooting and diagnosing.<br><br>**NOTES:**<br>• Each PACE has its own syslog files. Therefore, the syslog files must be removed from each individual PACE on the diagnostics page. This can be done by selecting the tab corresponding to the valve tag.<br>• This process will take a longer amount of time than retrieving diagnostic files because the syslog files are much larger files. The files also must be extracted from the PACE and downloaded to your computer. |
| Remove Room Configuration | | Allows the user to remove the room configuration for all controllers connected on the RIN network.<br><br>**NOTE:** The BN_NAMES.DAT, ROOM.BAK, and AO#.CAL and ROOM.CFG files are all removed during this process. |
| Remove BACnet Overrides | | Allows the user to remove all persistent BACnet overrides for the room.<br><br>**NOTE:** BACnet overrides are saved to PACE as files. All BACnet override files should be removed after using the Remove BACnet Overrides feature. |
| Reset All Controllers | | Allows the user to reset all controllers connected on the RIN network. |

## Stored Files

File listings for each controller are also available in the Diagnostics page. Each PACE in the room will have a unique tab which shows all of the files currently stored on the controller:

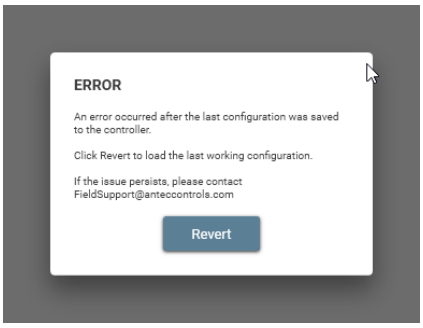



In a typical setup, the files that should appear in each tab are:

| **Venturi Valve** | **VFX/Terminal Unit** | **BACnet Files** |
|---|---|---|
| ROOM.CFG | ROOM.CFG | Custom Names |
| ROOM.BAK | ROOM.BAK | BN_NAMES.DAT *(Only if Custom BACnet names are used)* |
| LINE.STR | LINE.STR | Persistent Overrides *(Only available with PACE firmware 1.2.0 or higher)* |
| SYSLOG.001 | SYSLOG.001 | MV#.DAT |
| AO#.CAL *(only if using VV valve and calibration has been completed)* | | AV#.DAT |
| POT1.CRV | | AO#.DAT |
| POT2.CRV *(Triple Venturi Valves Only)* | | AI#.DAT<br>BI#.DAT |
| AO3.CAL *(Triple Venturi Valves Only)* | | BO#.DAT |
| | | SCH#.DAT |
| | | **NOTE:** Persistent overrides are only displayed if BACnet overrides are present. |

## Configuration Backups

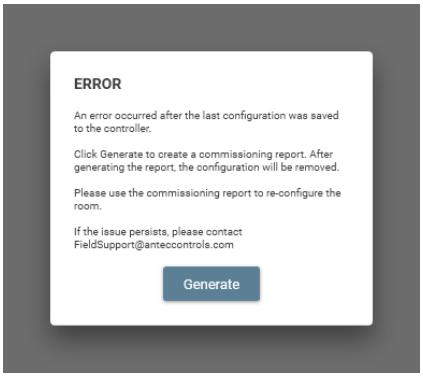
If an error is experienced while attempting to load a room configuration, the user will be prompted with one of the options shown below.




**Revert**

If a ROOM.BAK file is present on the controller, then the user will be prompted to revert the room to the last working configuration.

This will load the ROOM.BAK file as the room configuration to ensure that none of the settings are lost due to the error.




**Generate**

If a ROOM.BAK file is not present on the controller, then the user will be prompted to remove the room configuration that experienced the error.

Before removing the room configuration, Toolbox will generate the commissioning report that can be used when reconfiguring the room.

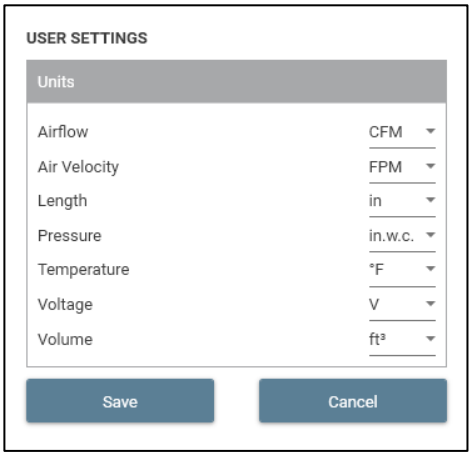
**NOTE:** After removing the room configuration, reconfiguration of the room is required.

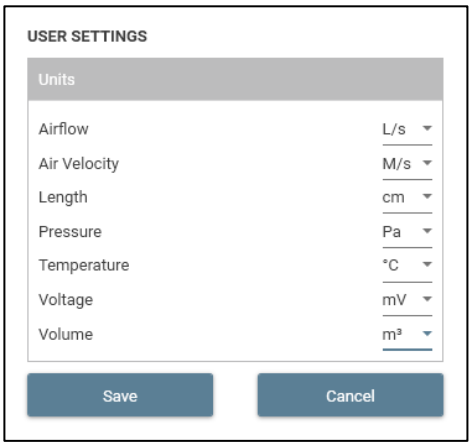
**CAUTION**

If the issue continues to persist, please contact Antec Controls Field Support for assistance.

## User Settings

The user settings menu allows for the units to be set to either imperial or metric. The options for imperial and metric are depicted below.




**User Settings**

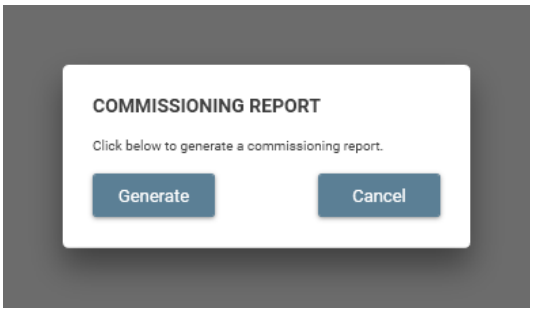
The following options for units are available in the User Settings Menu.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Airflow | CFM<br>L/s | Allows the user to select either metric or imperial airflow units. |
| Air Velocity | FPM<br>M/s | Allows the user to select either metric or imperial air velocity units. |
| Length | In<br>Cm | Allows the user to select either metric or imperial length units. |
| Pressure | In.w.c.<br>Pa | Allows the user to select either metric or imperial pressure units. |
| Temperature | Fahrenheit<br>Celsius | Allows the user to select either metric or imperial temperature units. |
| Voltage | V<br>mV | Allows the user to select either mV or Volts. |
| Volume | $Ft^3$<br>$M^3$ | Allows the user to select either metric or imperial volume units. |

**NOTE:** Changing the units in Toolbox will also change the units that are viewed over BACnet.

## Commissioning Report

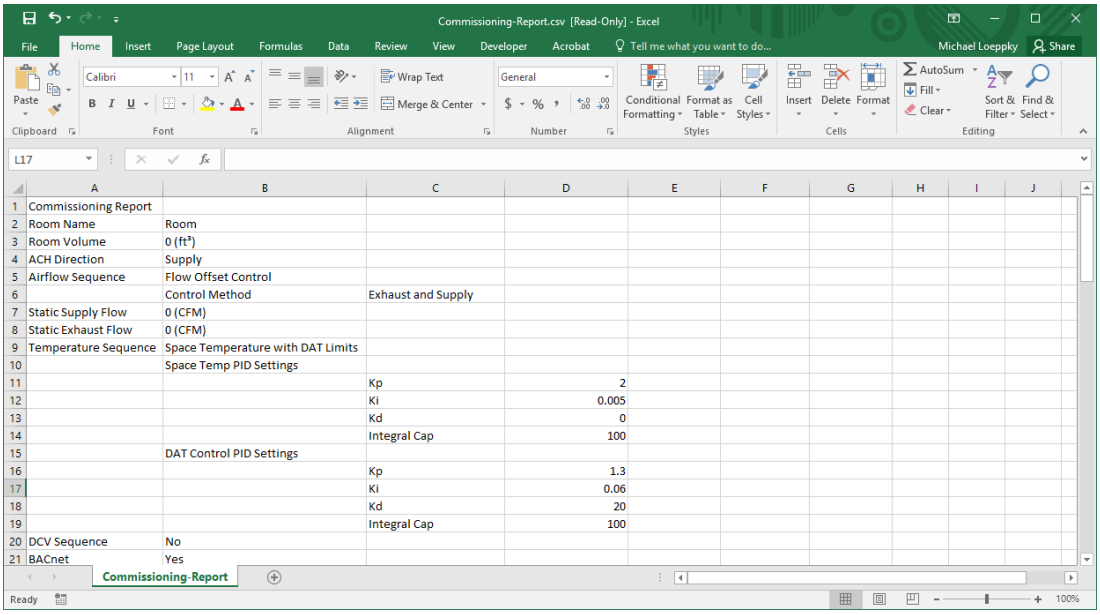
Allows the user to generate a commissioning report. When *Generate* is selected the user will be prompted to save a ZIP file that includes the following files.




**NOTE:** Commissioning Reports should be created whenever the user has completed configuration of a room. This will assist with future troubleshooting and will ensure that reports can be submitted upon successful completion of the project start-up.

### Commissioning Report

The commissioning report includes all details of the room configuration in a csv formatted file. The report will present valve specific configuration and room control settings. It is important to generate a commissioning report for each room setup to have record of the inputs and outputs configured for each valve as well as the room control settings. Below is a sample of the formatting used for the commissioning report.




| | A | B | C | D |
|---|---|---|---|---|
| 1 | Commissioning Report | | | |
| 2 | Room Name | Room | | |
| 3 | Room Volume | 0 (ft³) | | |
| 4 | ACH Direction | Supply | | |
| 5 | Airflow Sequence | Flow Offset Control | | |
| 6 | | Control Method | Exhaust and Supply | |
| 7 | Static Supply Flow | 0 (CFM) | | |
| 8 | Static Exhaust Flow | 0 (CFM) | | |
| 9 | Temperature Sequence | Space Temperature with DAT Limits | | |
| 10 | | Space Temp PID Settings | | |
| 11 | | | Kp | 2 |
| 12 | | | KI | 0.005 |
| 13 | | | Kd | 0 |
| 14 | | | Integral Cap | 100 |
| 15 | | DAT Control PID Settings | | |
| 16 | | | Kp | 1.3 |
| 17 | | | Ki | 0.06 |
| 18 | | | Kd | 20 |
| 19 | | | Integral Cap | 100 |
| 20 | DCV Sequence | No | | |
| 21 | BACnet | Yes | | |

### ROOM.CFG

Configuration file containing all settings from the room's setup.

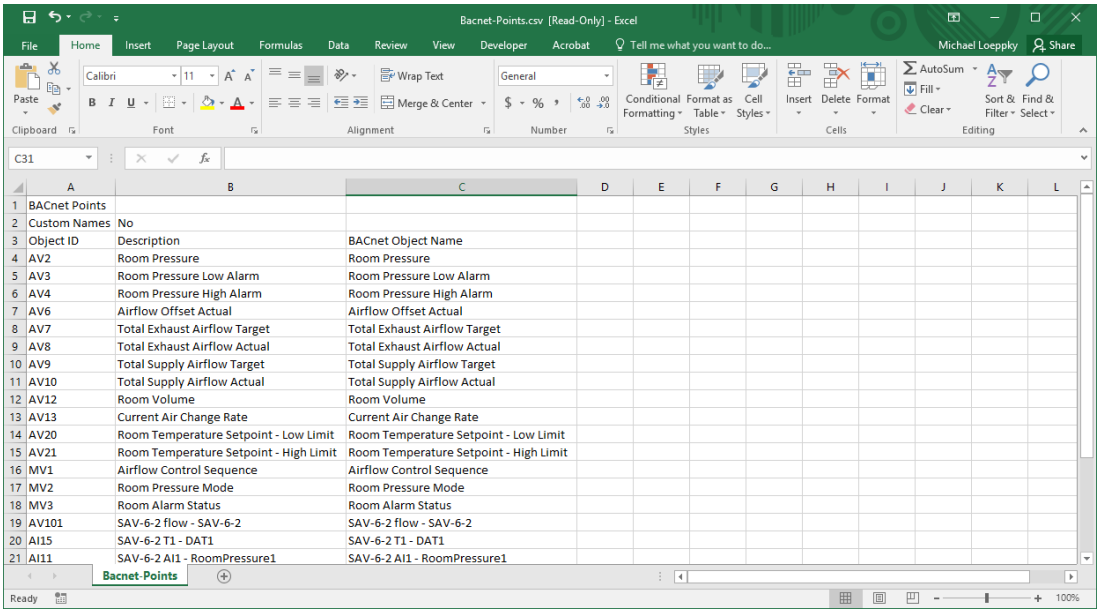
**NOTE:** This file should be stored for back-up purposes after each trip to the job-site and at the end of the project start-up. When troubleshooting, this can provide valuable information to the Antec Controls Field Support Team to help assess any potential configuration issues.

## BACnet Names

Exports a list of all of the current BACnet Points based on the room's configuration.

The BACnet Points file is extremely useful to provide to the controls contractor so they have a concise list of all the available BACnet points from each room.

**NOTE:** The file is only generated as part of the commissioning report if BACnet is configured for the room.



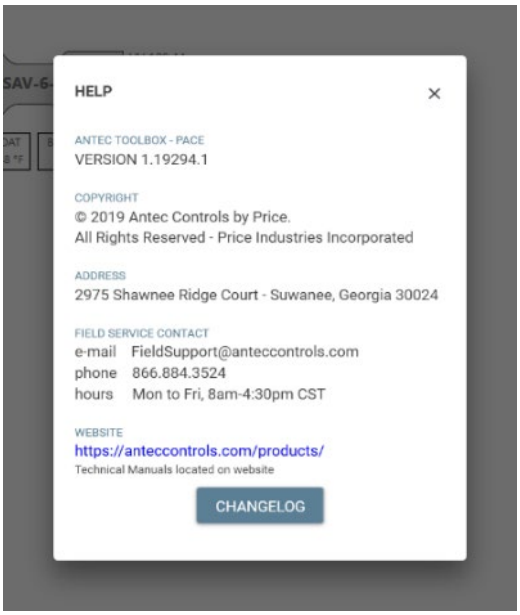

| | A | B | C |
|---|---|---|---|
| 1 | BACnet Points | | |
| 2 | Custom Names | No | |
| 3 | Object ID | Description | BACnet Object Name |
| 4 | AV2 | Room Pressure | Room Pressure |
| 5 | AV3 | Room Pressure Low Alarm | Room Pressure Low Alarm |
| 6 | AV4 | Room Pressure High Alarm | Room Pressure High Alarm |
| 7 | AV6 | Airflow Offset Actual | Airflow Offset Actual |
| 8 | AV7 | Total Exhaust Airflow Target | Total Exhaust Airflow Target |
| 9 | AV8 | Total Exhaust Airflow Actual | Total Exhaust Airflow Actual |
| 10 | AV9 | Total Supply Airflow Target | Total Supply Airflow Target |
| 11 | AV10 | Total Supply Airflow Actual | Total Supply Airflow Actual |
| 12 | AV12 | Room Volume | Room Volume |
| 13 | AV13 | Current Air Change Rate | Current Air Change Rate |
| 14 | AV20 | Room Temperature Setpoint - Low Limit | Room Temperature Setpoint - Low Limit |
| 15 | AV21 | Room Temperature Setpoint - High Limit | Room Temperature Setpoint - High Limit |
| 16 | MV1 | Airflow Control Sequence | Airflow Control Sequence |
| 17 | MV2 | Room Pressure Mode | Room Pressure Mode |
| 18 | MV3 | Room Alarm Status | Room Alarm Status |
| 19 | AV101 | SAV-6-2 flow - SAV-6-2 | SAV-6-2 flow - SAV-6-2 |
| 20 | AI15 | SAV-6-2 T1 - DAT1 | SAV-6-2 T1 - DAT1 |
| 21 | AI11 | SAV-6-2 AI1 - RoomPressure1 | SAV-6-2 AI1 - RoomPressure1 |

### CAUTION

If configuration changes are made after the initial export, it is important to provide the controls contractor with a new list to ensure they are working with the most up-to-date information.

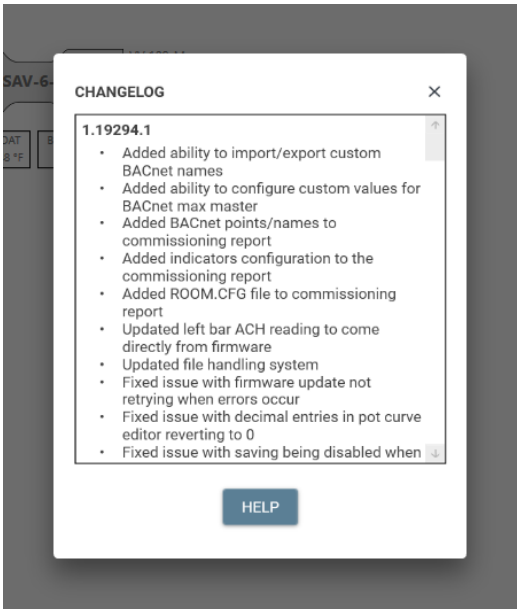
## Help

The help menu allows the user to check the version of Toolbox being run, presents field support contact information, provides a link to the website, and presents a changelog for Toolbox versions.




### Changelog

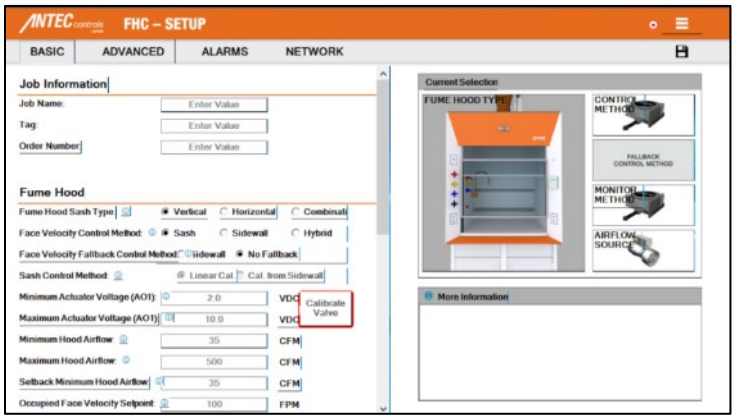
The changelog presents the changes made for each new version of Toolbox software.



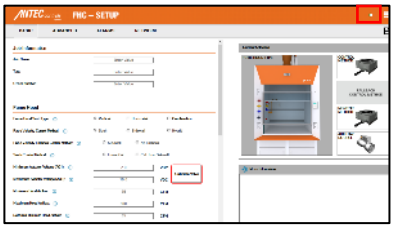
# FHC

## Home Screen

After selecting FHC, the user is presented with the following screen:




**NOTE:** Antec Toolbox cannot be used to configure FHC's with VFX. Settings must be configured through the Fume Hood Interface.



### Connection Status

The FHC setup menu has a circular status light:

Green: Toolbox is connected to the FHC.

Red: Toolbox is not connected to the FHC.

**NOTE:** If a connection is not detected upon start-up, the program will display "No Linker Found". After correcting any connection issues, click the connection status to attempt to reconnect.

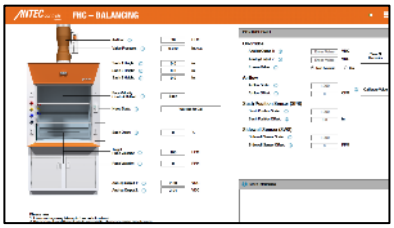
### Setup

| Variable Name | Description |
|---|---|
| Basic | Allows user to, input basic settings, calibrate the valve and calibrate the sash position sensor (SPS). This menu should cover the majority of the settings required for setup. |
| Advanced | Allows user to configure inputs, outputs and display settings. |
| Alarms | Allows user to set face velocity, airflow, valve pressure and sash height alarms. |
| Network | Allows user to setup a FHC for BACnet or FHN (Mnet). |

### Menu Button

Click this dropdown to access the settings menu for the FHC. See FHC – Settings for further information on available settings in each menu.

| Variable Name | Description |
|---|---|
| Balancing | Displays live readings for fume hood balancing |
| Setup | FHC Configuration. |
| Generate Commissioning Report | Commissioning Report: Exports a PDF of all FHC settings. |
| Export Commissioning Data | Exports a CSV file of all FHC configuration settings. |
| Import Commissioning Data | Allows the user to import a commissioning CSV file with previously configured FHC settings. |
| Help | Provides FHC firmware version and Field Support contact information. |
| Exit | Closes program |




**Balancing Page**

Displays live readings including airflow, valve pressure, sash height and face velocity.

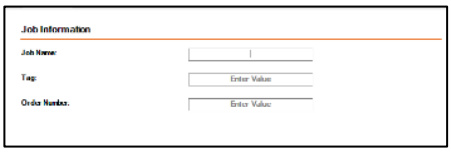
Presents information including face velocity control method and fume hood state.

Allows technicians to work with TAB by utilizing analog output overrides, airflow scale, airflow offset and valve calibrations.

**NOTE:** If the FHC has already been configured when the program is opened, the Balancing Menu will automatically appear.

# Settings

## Basic

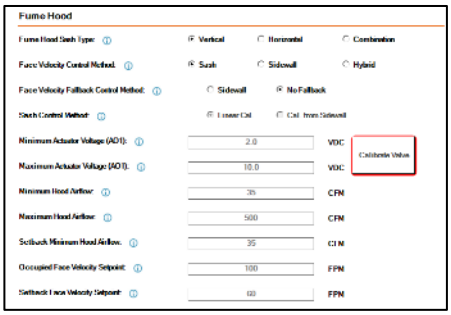



**Job Information**

Allows the user to input basic jobsite information.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Job Name | No Character Limit | Job name to be displayed on the commissioning report. |
| Tag | No Character Limit | Valve tag to be displayed on the commissioning report. |
| Order Number | No Character Limit | Order number to be displayed on the commissioning report. |

**NOTE:** When commissioning data is exported the file name format will populate based on the variables.




## Fume Hood

Set up the primary control sequencing for the fume hood.

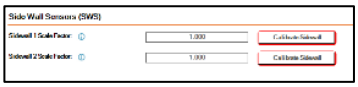
| Variable Name | Available Options/Range | Description |
|---|---|---|
| Fume Hood Sash Type | Vertical<br>Horizontal<br>Combination | Used for graphic representation in the software for the type of fume hood. |
| Face Velocity Control Method | Sash<br>Sidewall<br>Hybrid | Configured the control type for the fume hood.<br>Sash will measure the height of the sash and calculate how much airflow is required based on the height.<br>Sidewall measures the face velocity and controls the valve until the face velocity setpoint is achieved.<br>Hybrid uses a combination of both sash and sidewall control.<br><br>**NOTE:** Options will be available based on which sensors are detected. If a sidewall sensor is not installed, Sidewall and Hybrid will not be available. |
| Face Velocity Fallback Control Method | Sidewall<br>No Fallback | If both sash and sidewall sensors are installed on the fume hood, the user will have the ability to set up a fallback method in the case that the sash sensor ever fails. |
| Sash Control Method | Linear Cal.<br>Cal. From Sidewall | Allows the user to map out the sash sensor's response.<br>Linear Cal. will use the calculation for open area based on sash height and width to determine the required airflow.<br>Cal. From Sidewall will allow the user to map out the sashes required airflow based on a reading from the sidewall sensor.<br><br>**NOTE:** Cal. From Sidewall is only available if both sash and sidewall are installed. |
| Minimum Actuator Voltage | 0 to 10 Volts | Minimum voltage for the actuator output. |
| Maximum Actuator Voltage | 0 to 10 Volts | Maximum voltage for the actuator output. |
| Minimum Hood Airflow | Scheduled Value | Minimum scheduled airflow for the fume hood. |
| Maximum Hood Airflow | Scheduled Value | Maximum scheduled airflow for the fume hood. |
| Setback Minimum Hood Airflow | Scheduled Value | Minimum airflow when in an unoccupied mode. |
| Occupied Face Velocity Setpoint | Scheduled Value | Face velocity setpoint for the fume hood. Typically, 100 FPM, but depends on the fume hood specifications. |
| Setback Face Velocity Setpoint | Scheduled Value | Face velocity setpoint for the fume hood when the hood is not in use. Typically 60 FPM, but depends on the fume hood specifications. |
| Calibrate Valve | User Selection | Strokes the actuator from full closed to full open to map out the actuator voltage to the airflow value.<br><br>**NOTE:** This must be performed to properly complete setup. Will be bordered by a Green outline after it has been completed. |


### Sash Position Sensors (SPS)

Auto-detects the number of sash sensors wired to the FHC.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Sash 1 Min. Height | 0 to 120 inches | Must be the full closed position of the fume hood. Go past any stops that may be in place. |
| Sash 1 Max Height | 0 to 120 inches | Must be the full open position of the fume hood. Go past any stops that may be in place. |
| Sash Width | 0 to 120 inches | Width of the sash. |

**NOTE:** The FHC can support up to three SPS. Every SPS must be calibrated individually. After the sensor is calibrated, the outline will become Green.




### Side Wall Sensors (SWS)

Auto-detects the number of side wall sensors wired to the FHC.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Scale Factor | 0.5 to 2.0 | Sets scale factor for side wall sensor.<br><br>**NOTE:** This should only be adjusted if the technician or the balancer has measured face velocity during the sensor calibration. |

**NOTES:**

- The FHC can support up to two SWS.
- When zeroing the sidewall sensor use tape to cover it. Both ports on the inside and outside of the hood must be covered.
- The calibration will calibrate both sensors at the same time. After the sensor(s) are calibrated, the outline will become Green.

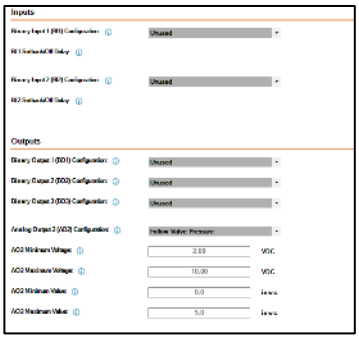
## Advanced


### Fume Hood

Advanced fume hood settings.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Face Velocity Monitor Method | Sash<br>Sidewall | Sets the sensor used to display face velocity on the FHI.<br><br>**NOTE:** Whenever using Sidewall or Hybrid control it is recommended that the monitor method is Sidewall. |
| Airflow Control Device | Venturi Valve | Sets the type of airflow device being controlled.<br><br>**NOTE:** Toolbox is only compatible with Venturi Valve setups for the FHC. |
| Report Zero CFM When OFF | Enabled<br>Disabled | When enabled, if the FHC is in the Off Mode, zero airflow will be reported over the FHN to PACE. When disabled, if the FHC is in the Off Mode, the minimum airflow of the valve will be reported over FHN to PACE.<br><br>**NOTE:** This is helpful when using Venturi Valves with a sequence that turns a dedicated exhaust fan off when the hood is in Off Mode. |
| Face Velocity Deadband | 5 to 40 | Sets the deadband range on the face velocity reading.<br><br>**EX:** If deadband is set to 10 FPM if the face velocity reading is between 90 FPM to 110 FPM it will display 100 FPM on the FHI. |
| Damper Position When Off | 0 to 100% | Sets the damper position when the FHC is in the Off Mode. |

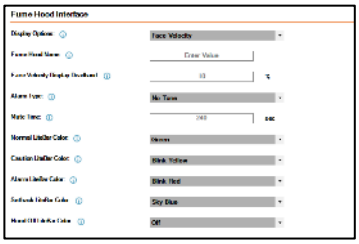
**NOTE:** For a VFX the setup wizard on the FHI must be used. Please refer the FHC manual for further instructions.




**Inputs/Outputs**

Configuring the FHCs inputs and outputs allows for full customization based on the sequence of operation.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Binary Input 1<br>Binary Input 2 | Unused | Binary Input has no functionality. |
| | Setback on Closed | When contact is closed, the FHC will enter Setback Mode. |
| | Setback on Opened | When contact is open, the FHC will enter Setback Mode. |
| | Off on Closed | When contact is closed, the FHC will enter Off Mode. |
| | Off on Opened | When the contact is open, the FHC will enter Off Mode. |
| | Alarm on Closed | When the contact is closed, an Alarm will display on the FHI. |
| | Caution on Closed | When the contact is closed, a Caution will display on the FHI. |
| | Emergency Purge on Closed | When the contact is closed, the FHC will enter Emergency Purge. |
| Binary Output 1<br>Binary Output 2<br>Binary Output 3 | Unused | Binary output has no functionality. |
| | Active During Force On | Binary output is active when the FHC is forced to Occupied Mode. |
| | Active During Force Off | Binary output is active when the FHC is forced to Off Mode. |
| | Active During Normal | Binary output is active when the FHC is operating as expected. |
| | Active During Occupied | Binary output is active when the FHC is in Occupied Mode. |
| | Active During Setback | Binary output is active when the FHC is in Setback Mode. |
| | Active during Alarm | Binary output is active when the FHC is in alarm. |
| | Active during Caution | Binary output is active when the FHC is in caution. |
| | Follow BI1 | Binary output will be active if binary input 1 is active. |
| | Follow BI2 | Binary output will be active if binary input 2 is active. |
| | Active During Emergency | Binary output is active when the FHC is in Emergency Purge. |
| | Active During Sash 1, Sash 2 or Sash 3 Use | Binary output is active when the sash is above the minimum working height. |
| Analog Output 2 | Unused | Analog output has no functionality. |
| | 5V during Alarm | AO2 will output 5 VDC when the FHC is in alarm. |
| | Follow Face Velocity | Outputs a user set voltage signal for a user set face velocity range. |
| | Follow Valve Pressure | Outputs a user set voltage signal for a user set pressure range. |
| | Follow Valve Flow | Outputs a user set voltage signal for the full valve range. |
| AO2 Minimum Voltage | 0 to10 Volts | Minimum voltage of the analog output. |
| AO2 Max Voltage | 0 to 10 Volts | Maximum voltage of the analog output. |
| AO2 Minimum Value | 0 to 500 FPM<br>0 to 5.0 in.w.c | Sets the minimum value for AO2.<br><br>**NOTE:** Will be in in.w.c. if AO2 usage is Follow Valve Pressure or in FPM if AO2 usage is Follow Face Velocity. |
| AO2 Maximum Value | 0 to 500 FPM<br>0 to 5.0 in.w.c | Sets the maximum value for AO2.<br><br>**NOTE:** Will be in in.w.c. if AO2 usage is Follow Valve Pressure or in FPM if AO2 usage is Follow Face Velocity. |



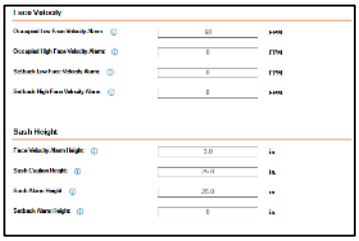

**Fume Hood Interface**

Configures the display settings for the Fume Hood Interface.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Display Options | Face Velocity<br>Name & Face Velocity<br>Normal & Alarm<br>Name & Normal & Alarm | Value to be displayed on screen. |
| Fume Hood Name | 14 characters | The fume hood name that can be displayed on the interface if required. |
| Face Velocity Deadband | 0 to 100 | Prevents nuisance alarms when nearing the minimum airflow for the fume hood.<br>This deadband is the difference of the current airflow to the Min airflow for the hood. While inside of this deadband, the display will show the face velocity setpoint. |
| Alarm Type | No Tone<br>Steady 2KHz<br>Wail<br>Red Alert | Audible alarms can be used to provide feedback to the user when an error has occurred with the fume hood. |
| Mute Time | 0 to 20,000 Seconds | The audible alarm can be silenced for a set time delay by pushing the mute button on the interface. |
| Normal LiteBar Color | Green<br>White<br>Sky Blue<br>Off | Sets the LiteBar color when the fume hood is in normal operation. |
| Caution LiteBar Color | Blink Red<br>Red<br>Blink Green<br>Blink Yellow<br>Yellow<br>Off | Sets the LiteBar color when the fume hood is in caution. |
| Alarm LiteBar Color | Blink Red<br>Red<br>Off | Sets the LiteBar color when the fume hood is in alarm. |
| Setback LiteBar Color | Green<br>White<br>Sky Blue<br>Off | Sets the LiteBar color when the fume hood is in Setback Mode. |
| Hood Off LiteBar Color | Green<br>White<br>Sky Blue<br>Off | Sets the LiteBar color when the fume hood is in the Off Mode. |

**NOTE:** Once setup has been completed through FHC-Setup software. Settings can be adjusted through the FHI. The FHC manual has detailed menu options and can be found on the Antec Controls website.

## Alarms



### Face Velocity and Sash Height

Configure all the alarms on the FHC.

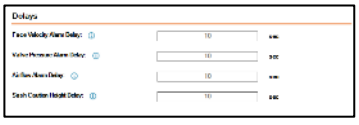
| Variable Name | Available Options/Range | Description |
|---|---|---|
| Occupied Low Face Velocity Alarm | Disabled<br>1 to 100 | Low alarm for the face velocity reading in Occupied Mode. Measured or Calculated face velocity below this value will trigger an alarm. |
| Occupied High Face Velocity Alarm | Disabled<br>100 to 200 | High alarm for the face velocity reading in Occupied Mode. Measured or Calculated face velocity above this value will trigger an alarm. |
| Setback Low Face Velocity Alarm | Disabled<br>1 to 100 | Low alarm for the face velocity reading in Setback Mode. Measured or Calculated face velocity below this value will trigger an alarm. |
| Setback High Face Velocity Alarm | Disabled<br>60 to 200 | High alarm for the face velocity reading in Setback Mode. Measured or Calculated face velocity above this value will trigger an alarm. |
| Face Velocity Alarm Height | Disabled<br>1 to Sash Max Height | Disables the high velocity alarm below this sash height. Prevents nuisance alarms as the hood is closer to the minimum sash position. |
| Sash Caution Height | Disabled<br>1 to Sash Max Height | Enables a caution if the sash is raised above this height. Will prompt the user to close the sash. |
| Sash Height Alarm | Disabled<br>1 to Sash Max Height | Enables an alarm if the sash is raised above this height. Will prompt the user to close the sash. |
| Setback Alarm Height | Disabled<br>1 to Sash Max Height | Enables an alarm if the sash is raised above this height when in Setback Mode. Will prompt the user to close the sash. |

**NOTES:** A value of 0 in any above fields will disable the alarm.

### Pressure/Airflow

Configure valve pressure and valve airflow alarms.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Low Valve Pressure | Disabled<br>0.1 to 5.0 in.w.c | Used for Venturi Valves. Will alarm if the valve differential pressure drops below the required operating pressure range. |
| High Valve Pressure | Disabled<br>0.1 to 5.0 in.w.c | Used for Venturi Valves. Will alarm if the valve differential pressure rises above the required operating pressure range. |
| Low Hood Airflow | Disabled<br>1 to 10,000 | Used if it is critical that the fume hood remains within a set airflow range. Will alarm if the valve airflow drops below this value. |
| High Hood Airflow | Disabled<br>1 to 10,000 | Used if it is critical that the fume hood remains within a set airflow range. Will alarm if the valve airflow rises above this value. |



### Delays

Add delay to any alarms to ensure no nuisance alarms are being triggered.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Face Velocity Alarm Delay | 0 to 30 | Sets the time delay between when the face velocity alarm is detected and when the interface alarms. |
| Valve Pressure Alarm Delay | 0 to 30 | Sets the time delay between when the valve pressure alarm is detected and when the interface alarms. |
| Airflow Alarm Delay | 0 to 30 | Sets the time delay between when the airflow alarm is detected and when the interface alarms. |
| Sash Caution Height Delay | 0 to 30 | Sets the time delay between when the sash caution is detected and when the interface cautions. |

## Network

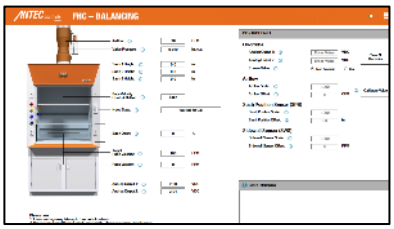
**Network**

Configure the network settings for either FHN (Mnet) or BACnet communication.

| Variable Name | Available Options/Range | Description |
|---|---|---|
| Communication Protocol | Mnet<br>BACnet | FHN (Mnet) is used any time that the FHC is connected to PACE.<br>If the unit is standalone, it can be connected to BACnet. |
| Network Termination | Enabled<br>Disabled | Sets whether the fume hood is end of line (EOL). EOL should only be enabled on the physical end of line FHC. |
| Mnet MAC Address | 0 to 16 | MAC Address for the fume hood controller on FHN.<br><br>**NOTE:** The MAC address must be unique for every FHC on the FHN. The network must begin at 1 and increase sequentially through to 16. |
| BACnet Baud Rate | 9,600<br>19,200<br>38,400<br>76,800 | Sets the BACnet communication speed.<br><br>**NOTE:** All devices on a BACnet segment must run at the same baud rate. |
| BACnet Device Instance | 1 to 4,194,303 | Sets the device instance.<br><br>**NOTE:** The device instance must be unique for every device in the facility. |
| BACnet MAC Address | 1 to 127 | MAC Address for the fume hood controller on BACnet.<br><br>**NOTE:** MAC address must be unique for every device on BACnet. |

**NOTE:** 16 fume hoods can be configured on a single FHN.

## Balancing



### Balancing

Allows the user to assist TAB with balancing the face velocity and valve airflow in the fume hood.

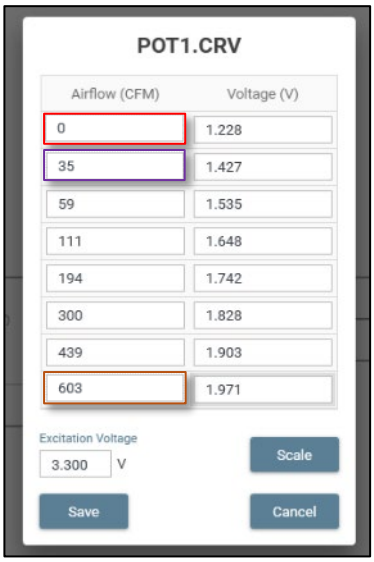
| Variable Name | Available Options/Range | Description |
|---|---|---|
| Airflow | Live Reading | Displays current valve airflow reading. |
| Valve Pressure | Live Reading | Displays current valve pressure reading. |
| Sash Height 1<br>Sash Height 2<br>Sash Height 3 | Live Reading | Displays current sash height. |
| Face Velocity Control Method | Sash Position Sensor (SPS)<br>Side Wall Sensor (SWS)<br>Hybrid | Sets the face velocity control method for the fume hood. |
| Hood State | Normal<br>Caution<br>Alarm | Displays the state of the fume hood. |
| Sash Open | Live Reading (%) | Displays the sash open percentage. |
| Target Face Velocity | Scheduled Value | Displays the target face velocity. |
| Face Velocity | Live Reading | Displays the current face velocity. |
| Analog Output 1<br>Analog Output 2 | Voltage Range | Displays the voltage outputs for AO1 and AO2. |
| Overrides | User Input | Allows the user to override the analog outputs to certain voltages. |
| Airflow Scale/Offset | User Input | Allows the user to scale or offset the airflow. |
| SPS Scale/Offset | User Input | Allows the user to scale or offset the SPS reading. |
| SWS Scale/Offset | User Input | Allows the user to scale or offset the SWS reading. |

# HOW TO

## Shutoff Valve Configuration

Shutoff Valves are designed to provide mechanical pressure independence, while also providing a 0-flow setting.

### Shutoff Valve Basics




**How to Identify a Shutoff Valve**

Antec Toolbox will not visually indicate to the user whether a valve is a Standard Venturi Valve or a Shutoff Venturi Valve.

Toolbox identifies Shutoff Valves using the following values in the POT Curve file.

| Variable Name | Description |
|---|---|
| First POT Point | If the valve is a Shutoff Venturi Valve, the first POT Point will be 0 CFM.<br><br>**NOTE:** This is the only indication in the software that the valve is a Shutoff Valve. |
| Second POT Point | Indicates the first POT point where the valve can achieve mechanical pressure independence. |
| Eighth POT Point | Indicates the last POT point in the curve, or the maximum airflow that the valve can provide. |

**NOTE:** The color of the Variable Name corresponds to the highlighted box in the image to the left.

**Mechanical Range**

The mechanical range of the valve is the full airflow range that the valve is capable of providing. This is indicated in the POT Curve as the range from the First POT Point to the Eighth POT Point.

**EX:** For the POT Curve shown to the left, the mechanical range is 0 CFM to 603 CFM.

**Operational Range**

The operational range of the valve is the range in which the valve is capable of maintaining its airflow setpoint with mechanical pressure independence. This is indicated in the POT Curve as the range between the Second POT Point and the Eighth POT Point.

**EX:** For the POT Curve shown to the left, the operational range is 35 CFM to 603 CFM.

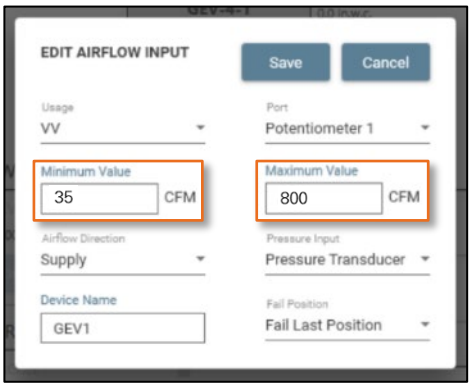
**Shutoff Zone**

The shutoff zone is the range in which the valve is not capable of maintaining its airflow setpoint with mechanical pressure independence. This is indicated in the POT Curve as the range between the First POT Point and the Second POT Point.

If the airflow target for the valve is in the Shutoff Zone, the valve will drive to the fully closed position to provide 0 CFM.

**EX:** For the POT Curve shown to the left, the Shutoff Zone is between 0 CFM and 35 CFM.

## Recommended Configuration for Supply or General Exhaust Valve Applications




**Recommended Configuration *(SAV & GEV)***

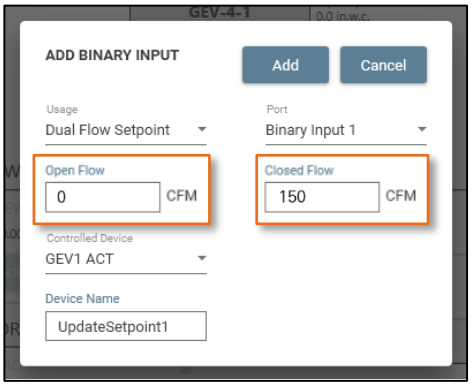
When using a Shutoff Venturi Valve in a Supply (SAV) or General Exhaust Valve (GEV) application, it is important to ensure that the Minimum CFM is configured to a value that is in the Operational Range of the valve, and not in the Shutoff Zone.

Using the settings below ensure that the valve will not fall into the Shutoff Zone during normal operation.

| Variable Name | Recommended Value |
|---|---|
| Minimum Value | Larger than the First POT Point, and smaller than the Maximum Value.<br><br>**EX:** For the POT Curve shown above, this Minimum flow should be greater than or equal to 35 CFM. |
| Maximum Value | Larger than the Minimum Value, and smaller than the Eighth POT Point.<br><br>**EX:** For the POT Curve shown above, this Maximum Flow should be 600 CFM. |

**NOTE:** Room Modes can still be used to override the valve to a full closed position if required.

## Recommended Configuration for Other Exhaust Valve Applications




**Recommended Setup *(2-Position Valve with PACE)***

When using a Shutoff Venturi Valve in an Other Exhaust Valve (OEV) application with a PACE controller, it is important to ensure the Minimum CFM is configured to either 0 CFM or a value that is not in the Shutoff Zone. The Maximum CFM should be in the Operational Range of the valve, and not in the Shutoff Zone.

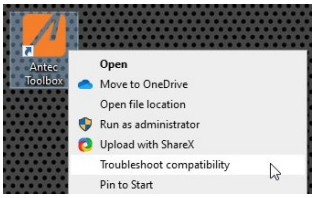
This gives the valve the ability to shutoff to 0 CFM when not in use, but ensures that it will not attempt to operate in the Shutoff Zone.

| Variable Name | Recommended Value |
|---|---|
| Open Flow | If 0 CFM is required, it can be entered here.<br>If 0 CFM is not required, then this value should be larger than the First POT Point, and smaller than the Closed Flow.<br><br>**EX:** For the POT Curve shown above, this Minimum flow can be 0 CFM or greater than or equal to 35 CFM. |
| Closed Flow | Larger than the Open Flow, and smaller than the Eighth POT Point<br><br>**EX:** For the POT Curve shown above, this Closed Flow should be between 35 and 600 CFM. |

**NOTE:** Settings recommended above are written for when a Closed Contact on the Binary Input corresponds to Opening the Valve. If a Closed Contact on the Binary Input corresponds to Closing the Valve, reverse the values for the Open Flow and Closed Flow variables.

# TROUBLESHOOTING

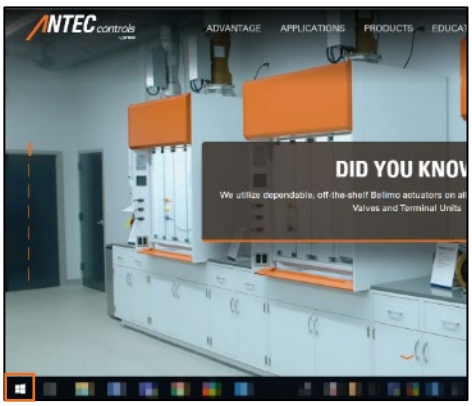
| Symptom | Possible Cause/Solution |
|---|---|
| Software does not automatically update to the latest version when connected to a network. | If using an unstable network connection, communication may be lost while checking for software updates. Download the latest version of Antec Toolbox from the login section of the website. |
| "**?**" shows instead of an image of the valve. | The PACE controller was ordered loose (not factory mounted to an airflow device).<br>1. Configure an Airflow Device for the valve.<br>a. Consult the product manual for the airflow device to ensure the correct airflow limits and/or k-factor are used.<br>b. In the case of a Venturi Valve, use the Edit Curve function to input the valve curve. |
| | Toolbox failed to load the linestring containing the necessary information to automatically configure the airflow device.<br>1. In the Diagnostics menu, look through the controllers that are online. Are any/all of them missing the LINE.STR file?<br>a. If **Yes**, contact Antec Controls Field Support.<br>b. If **No**, continue to next steps.<br>2. Check the status light on PACE. If it is GREEN, use the Remove Room Configuration feature in the Diagnostics menu<br>3. Close Toolbox<br>4. Check wiring for RIN connections and Ethernet cable used to connect to controllers.<br>5. After confirming all RIN wiring, re-open Toolbox.<br>6. If no pop-up is observed, contact Antec Controls Field Support. |
| Total Supply and Total Exhaust Airflow readings, Temperature readings and Indicators are not updating. | The "Master" PACE may be off-line.<br>1. Check power at all devices is sufficient and that the LED is **not RED**.<br>2. Confirm RIN wiring matches the wiring shown in the Network Section of the PACE manual.<br>To identify the "Master" PACE:<br>1. If the room was configured using Toolbox 1.19266.2 or later: The "Master" PACE is the first PACE displayed on the Home Screen.<br>2. If the room was configured using Toolbox earlier than 1.19266.2: Use the Retrieve Diagnostic Files feature and send the resulting file to Antec Controls Field Support for review. |
| Unable to connect to PACE controllers. | Toolbox may have been open prior to connecting to the RIN network.<br>1. Close Toolbox.<br>2. Connect to the RIN network.<br>3. Open Toolbox. |
| | Firewall may be blocking the network connection to RIN. See the Adjusting Windows Defender™ Firewall Settings. |
| | Possible faulty wiring.<br>1. Check that power at all devices is sufficient and that the LED is **not RED**.<br>2. Confirm RIN wiring matches the wiring shown in the Network Section of the PACE Manual. |
| | Controllers are stuck in a Reboot Cycle:<br>1. Were any changes made to the controllers before the issue occurred?<br>2. Was firmware updated unsuccessfully?<br>3. Check the PACE controller LED color.<br>a. If the PACE LEDs are flashing from Blue to Green constantly, the controllers will need to be replaced. Please contact your local Antec Controls Representative. |
| T1 or T2 reading 244ºF | Possible faulty wiring – indicates a "short circuit"<br>1. Check that the thermistor wires are properly wired to the input terminal.<br>2. Check that the thermistor wire was not pinched or is not short circuited. |
| T1 or T2 reading 48ºF | Possible faulty wiring – indicates an "open circuit"<br>1. Check that the thermistor wires are properly wired to the input terminal.<br>2. Check that the thermistor wire does not have a break or cut in the line. |

| | |
|---|---|
| Unable to add reheat AO. | Possibly limited by Temperature sequence.<br>Space Temperature Control with DAT Limits requires a DAT probe before being able to add an Analog Output for the Reheat Usage. |
| Network Fault | Indicates unexpected voltage pulses on the NET1 or NET2 COM ports.<br>1. Check polarity of the MS/TP segment.<br>2. Check 24 VAC power polarity on any 3rd party devices to ensure polarity is consistent with the PACE controllers on the MS/TP segment.<br>3. Use a multimeter to measure AC voltage on NET COM. |
| Antec Toolbox installer does not open. | Possible compatibility issue. Right click the Antec Toolbox app and click Troubleshoot compatibility.<br>  |

## Adjusting Windows Defender™ Firewall Settings

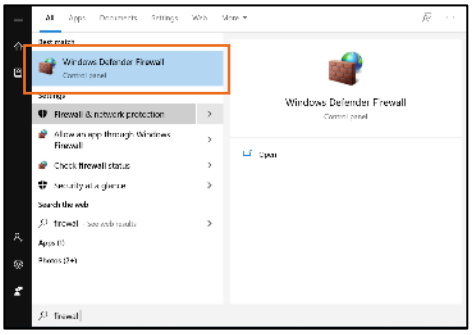
This section details how to manually allow Antec Toolbox through your Windows Defender™ Firewall Settings.

**NOTE:** The following instruction are for a Windows 10 operating system.



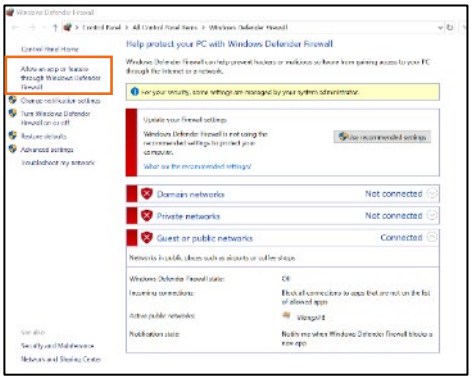

**STEP 1**

Select the **Start** button.



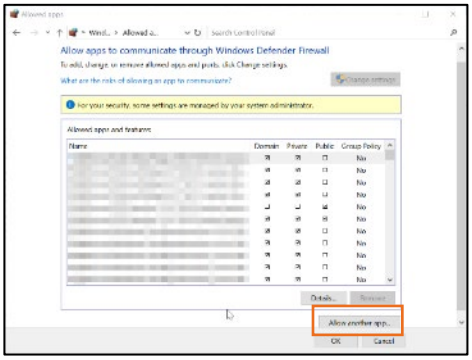

**STEP 2**

Type "firewall" in the start menu and select the Windows Defender™ Firewall option.



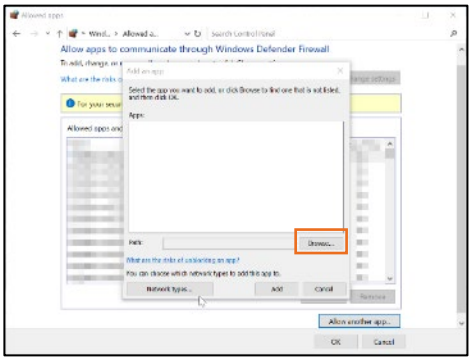

**STEP 3**

Choose the **Allow an app or feature through Windows Defender™ Firewall** option on the left side of the window.



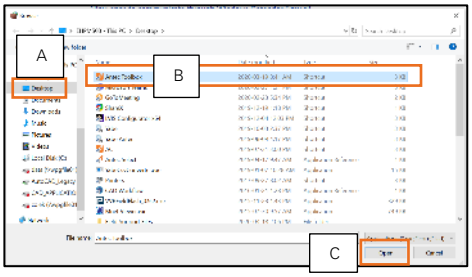

**STEP 4**

Select **Allow another app** in the bottom right hand corner of the window.



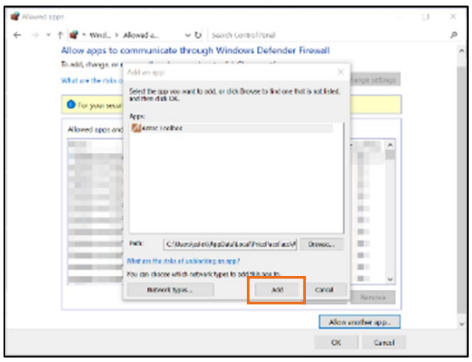
**STEP 5**

Select **Browse**.



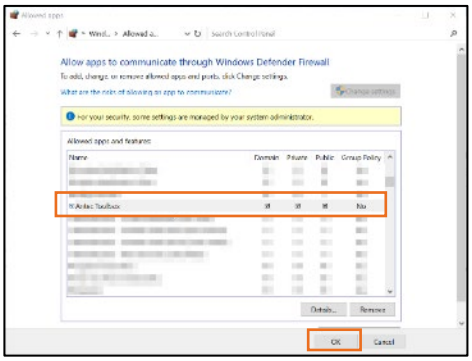

**STEP 6**

Select **Desktop** in the quick access bar of the window (A). Then select the Antec Toolbox Program (B), and click **Open** in the bottom right corner of the window (C).



**STEP 7**

Select Antec Toolbox and then click **Add**.



**STEP 8**

Check the box to the left of the Antec Toolbox, this will allow access for the application through the firewall. Then check all three boxes to allow access for Domain, Private, and Public networks.

To exit select **OK** in the bottom right corner of the window. Antec Toolbox has successfully been allowed through the Windows Defender™ Firewall.

## Technical Support

If technical support is required, please contact us:

By Email @ FieldSupport@AntecControls.com

By Phone @ 866-884-3524

Hours of Operation: Monday – Friday, 8am to 4:30pm CST

**NOTE:** If you will need support after hours, please contact us 48 hours in advance.

# CHANGELOG

| Manual Version | Toolbox Release | Changes |
|---|---|---|
| v100 | 1.19029.1 | Initial release |
| v110 | 1.19233.1 | Formatting changes<br>Image changes<br>Added Section for Advanced BACnet Settings<br>Added Section for Changelog<br>Added Voltage type input in Analog Inputs section |
| v111 | 1.19266.2<br>1.19294.1 | Formatting changes<br>Image changes<br>Added Cooling Devices to Analog Output section<br>Added Cooling Maximum and Heating Maximum to Supply Airflow Control and Exhaust Airflow Control sequences<br>Added Controller Ordering and BACnet MAX Master to Advanced BACnet Settings<br>Added BACnet Naming Report and ROOM.CFG to Commissioning Report |
| v112 | 1.19324.2<br>1.20006.3 | Image changes<br>Added ROOM.BAK description and functionality |
| v113 | 1.20016.4 | Updated balancing menu<br>Added limit for User Created Room Modes<br>Added limits for devices in Airflow and Temperature Staging |
| v114 | 1.20043.1<br>1.20052.5<br>1.20062.1 | Updated SIN Device section<br>Updated Retrieve Room Diagnostic Files description<br>Updated the Firmware Update pictures |
| v115 | 1.20070.3 | Added a section to troubleshooting outlining how to adjust the Windows Defender™ Firewall settings to allow access for Antec Toolbox.<br>Updated information for the frequency of entering the Antec Toolbox password |
| v116 | 1.20120.1 | Updated Temperature Zones descriptions for Add Heating Stage and Add Cooling Stage buttons<br>Added items to troubleshooting section |
| v117 | 1.20140.3 | Updated to include “Automatic Updates”<br>Added items to troubleshooting section<br>Added “How To” Section<br>Added “Shutoff Valve Configuration” to How to Section |
| v118 | 1.20175.1 | Updated Connection Status in Controller Information section<br>Added items to troubleshooting section |
| v119 | 1.20232.1 | Updated Diagnostics for new “Remove BACnet Overrides” button<br>Updated Diagnostics for new BACnet Override Files<br>Updated Binary Inputs descriptions |
| v120 | 1.21020.1 | Updated Room Pressure usage in Analog Inputs to include Scale Factor and Offset<br>Updated Sensor Information Network (SIN) Devices to include Scale Factor and Offset |

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