

Smart Air Control Valve

User Guide

TABLE OF CONTENTS

CHAPTER 1

Introduction to the Smart Air Control Valve Application	3
About This User Guide	3
Purpose of the User Guide	3
Intended Audience	3

CHAPTER 2

Using Builder to Customize the SACV Application.....	4
Logging in to Builder	4
Configuring Your Equipment	4
Recompiling a Project	7
About Compilation Results	8

CHAPTER 3

Loading the SACV project on the controller	9
General Information	9
Loading the Application Code on the Controller.....	11
Troubleshooting	13

CHAPTER 4

Using the SACV Graphical Web Interface.....	14
Accessing the SACV Graphical Web Interface	14
Configuring the SACV	15
Configuring the Temperature Setpoints	16
Calibrating the SACV Room Flow	17
Configuring the Flow Setpoints	17
Performing SACV Airflow Calibration.....	17
Working with Alarms	18
Show/Hide Alarm Data Columns	18
Filter Options.....	19
Working with Trends	20

CHAPTER 1

Introduction to the Smart Air Control Valve Application

Distech Controls' Smart Air Control Valve (SACV) is a highly accurate, fully dynamic, pre-assembled air control valve solution. It has a superior turndown ratio and measures airflows as low as a few CFM. With this low airflow design, the same Smart Air Control Valve model can be used to control the airflow required for various applications and at a much wider range of space occupancy levels.

The Smart Air Control Valve is factory-programmed for commercial single duct airflow control using Distech Controls' *EC-gfx* Program. This graphical programming interface enables visual assembly using building blocks and the design of custom programs that control Building Automation Systems.

To save time and to take full advantage of the SACV application graphics, simply create a URL hyperlink from any BMS graphical interface to easily access the pre-existing graphics.

SACV Application Configuration

The SACV program can be configured easily and seamlessly using Builder by simply selecting the project requirements from the on-screen options. See [Using Builder to Customize the SACV Application](#) and the [Builder User Guide](#) for more information.

The SACV controls airflow through the use of ECY-VAV controllers that are BTL listed as BACnet Building Controller (B-BC). For more information regarding the characteristics or product specifications of the Smart Air Control Valve, refer to the [Smart Air Control Valve Spec Sheet](#).

About This User Guide

Purpose of the User Guide

This user guide is intended to provide information and instruct a user to configure an SACV controller from its preloaded applications using Builder and its Graphical Web Interface. However, this guide is not designed to instruct the user on how to use an SACV controller. For information on this controller, refer to the following documents, which are available on the Distech Controls Documentation and Resources Portal:

- [Smart Air Control Valve Spec Sheet](#),
- [Smart Air Control Valve Installation Guide](#),
- [ECLYPSE User Guide](#),
- [EC-gfxProgram User Guide](#)

Intended Audience

This user guide is intended for system designers, integrators, and field technicians who have experience with control systems. It is recommended that anyone engineering, programming and configuring the controllers specified in this user guide have prior training in using these controllers.

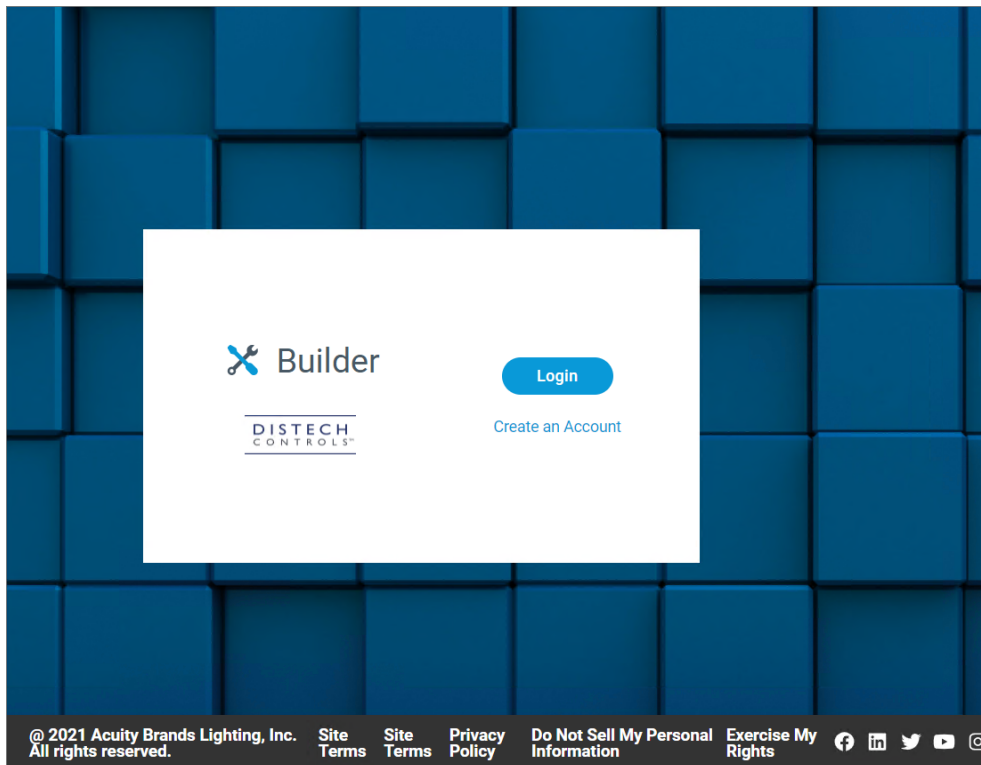
CHAPTER 2

Using Builder to Customize the SACV Application

The SACV's preloaded application can easily be configured from Builder, Distech Controls' cloud-based programming solution. Builder enables you to build dynamic modular HVAC applications for EC-*gfx*Program simply by selecting your options from the SACV equipment page. You can then download the corresponding EC-*gfx*Program applications, sequence of operations, equipment drawings, testing plans and points lists.

Logging in to Builder

Navigate to the Builder website by going to <https://builder.distech-controls.com> and click the **Login** button to sign into your account. If you do not have an account, click **Create an Account**.



Configuring Your Equipment



The Builder Home screen will typically have a list of equipment types or room configurations that come pre-organized and grouped according to required specifications. The systems on the Distech Controls Library tab are maintained by Distech Controls and are available to all users. There may be additional Library tabs (not shown here) that are maintained by your company administrators.

Clicking on a Library tab changes the content of the navigation tree.

The content of the tree will change over time as Distech Controls or your administrator edits and adds content.

The Language and Units specified in your user profile will determine the language and units of the projects you compile and export with Builder. For more information, refer to the [Builder End-User Guide](#).

Figure 1: Language and Unit options in Builder user profile

1. Navigate to the SACV equipment  to configure your controller.
2. Click the  icon to edit the name of the equipment to suit your naming convention. This name will be the filename of the corresponding .zip file that will contain your controller application at the end of this procedure.
3. Select the options that apply to your project. As some options are selected, other options may appear or disappear as a function of what was chosen. Required fields are highlighted in red and must be filled in before compiling a project. If needed, the **Reset** button will clear all equipment selections.

Parameter	Description
Controllers	Select the VAV controller model required for this application. NOTE: The SACV is only compatible with the ECY-VAV controller.
Equipment Type	Select the SACV model.
System Type	Indicate whether the SACV system is for Cooling only or with Reheat.
Compliance	Indicate whether the SACV project must be compliant with ASHRAE Guideline 36.

Parameter	Description
AutoCAD Drawings <ul style="list-style-type: none"> Flow Diagram Sequence of Operation 	Indicate whether the Flow Diagram and Sequence of Operation should be included in the project package, and in which format. Click the gear icon to edit the Output Options for each drawing file.
Room Temperature	Select the Type and Model of the temperature sensor connected to the SACV.
EC-Multi-Sensor	Select the model of the EC-Multi-Sensor, if any, connected to the SACV.
Sensor Setpoint Type	Select the Setpoint type used to control the temperature in the project.
Discharge Temperature	Select the type of the discharge temperature sensor, if any.
Duct Inlet	Select the type of variable, if any, that will be used in the EC- <i>gfx</i> Program code for the Duct Inlet.
Shedding	Select the type of variable, if any, that will be used in the EC- <i>gfx</i> Program code for Shedding.
ECLYPSE Commissioning Solution	Indicate whether the Auto-Commissioning block should be included in the EC- <i>gfx</i> Program code.
Hardware Inputs	Select the options for which Hardware Input blocks should be included in the EC- <i>gfx</i> Program code.
VAV Performance Assessment	Indicate whether VAV Performance Assessment should be enabled for the project. For more information, see the ECY-VAV Preloaded Applications User Guide .

4. Once finished, click the **Compile** button.

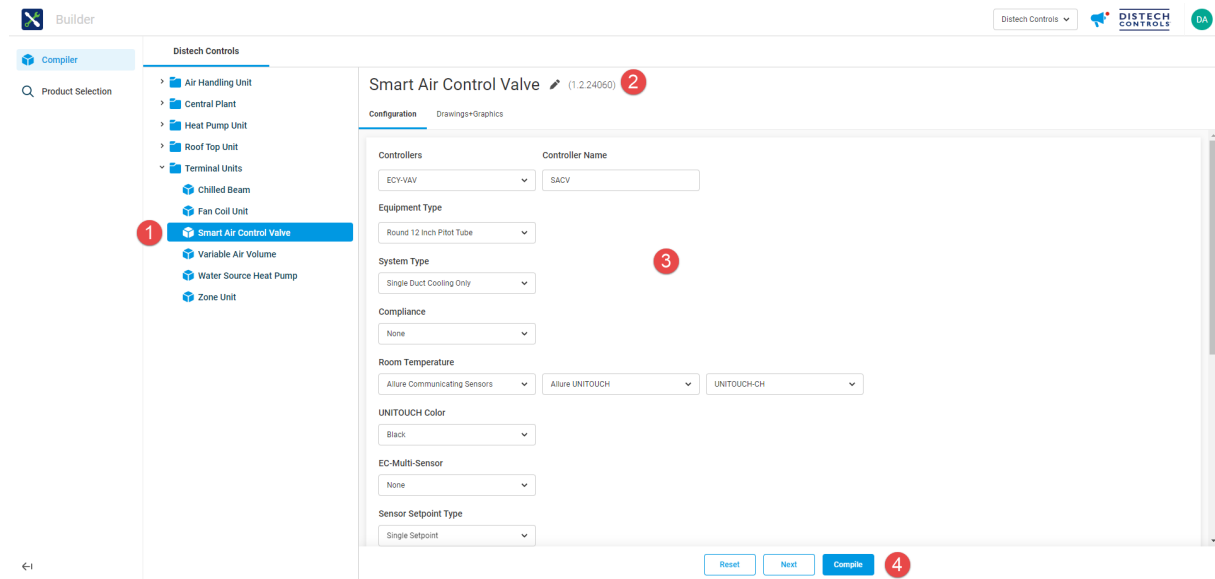


Figure 2: SACV Builder page (not all options are visible)

5. While the project is compiling, you will be presented with a pop-up screen displaying the results. If this pop-up window is closed during compilation, or after compiling, it can be re-opened by clicking the **Results** button on the equipment page. The results can show three tabs, one with a points list, one with the sequence of operation, and one with the testing procedure. The **Points List** tab will appear blank until the compilation is completed successfully. The **Sequence of Operations** and **Testing Procedures** tabs will display their content or will be hidden if no content has been made available for this system. To download a .ZIP file with the results along with the corresponding EC-*gfx*-Program application, click the **Download Controller** button.
If there was an error compiling the project, see the next section.

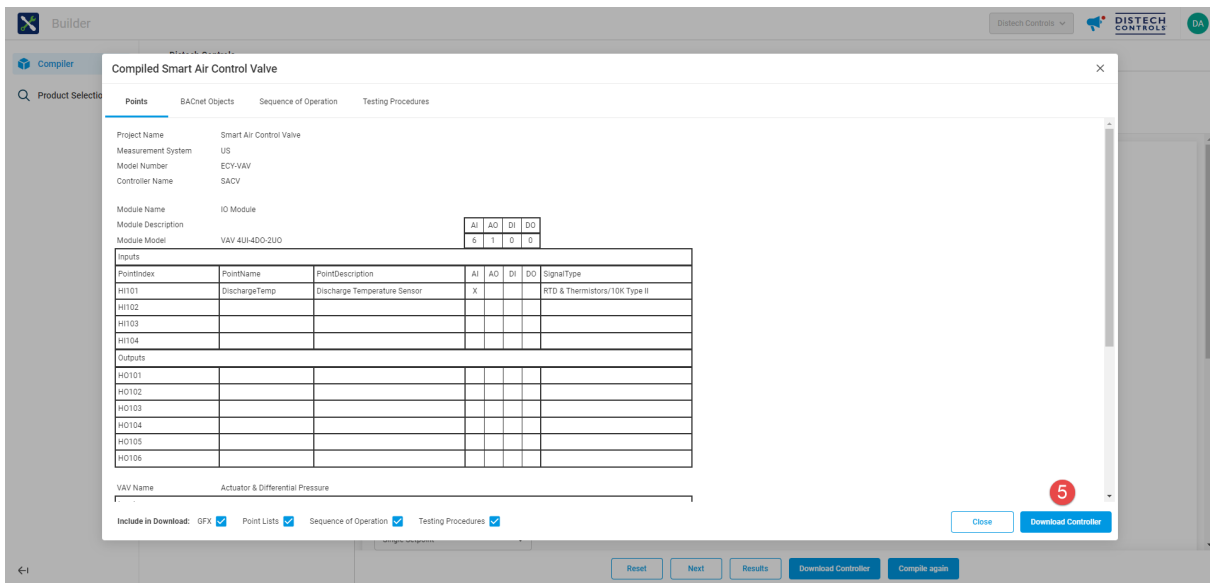
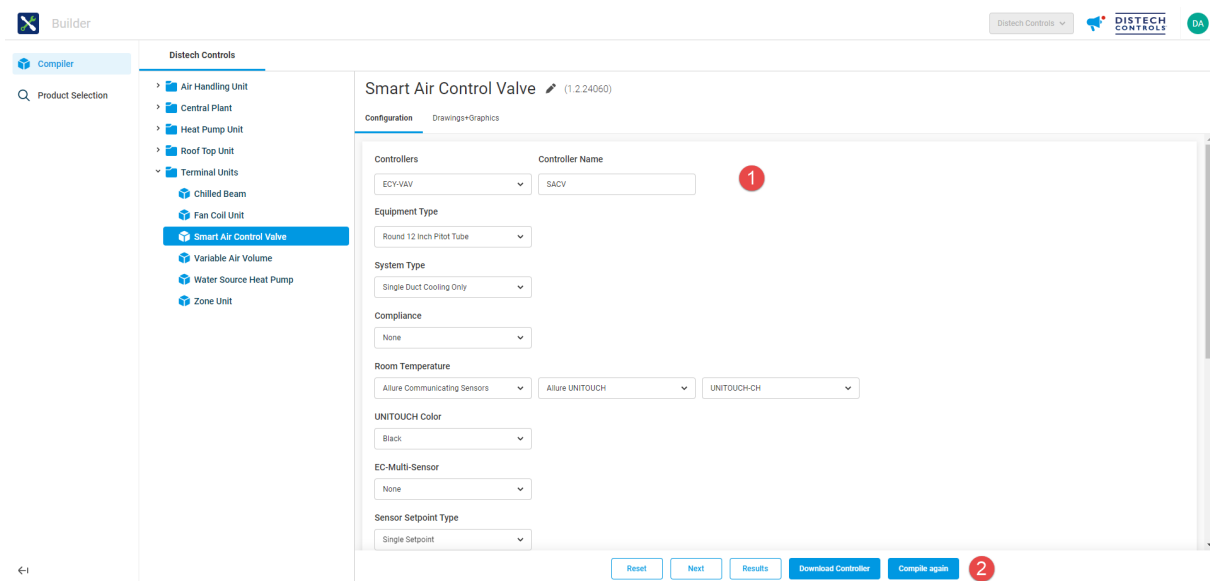


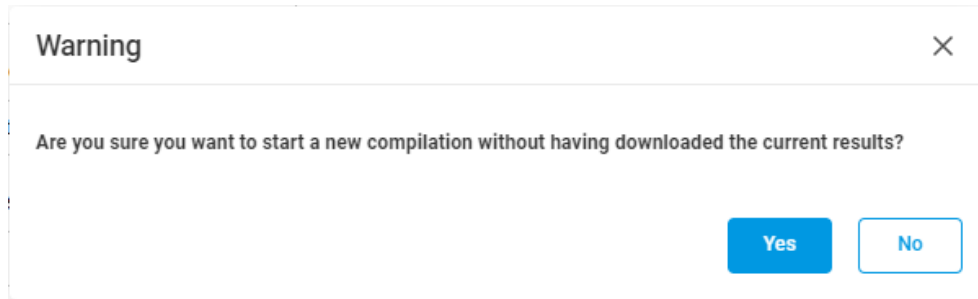
Figure 3: SACV project compilation results (points will vary depending on the selected options)

Recompiling a Project

If you wish to make a change to your project, you will be presented with a few more options on the configuration screen. You can also click the **Results** button to return to the previously compiled project summary screen.

1. From the configuration screen you will be able to individually change and modify your original project configuration as needed, or click the **Reset** button to clear all values.
2. Once finished, click the **Compile Again** button. A warning dialog box will be displayed when you Compile Again. If the user chooses to proceed with the new compilation, any previous results will be lost if they have not been already downloaded.





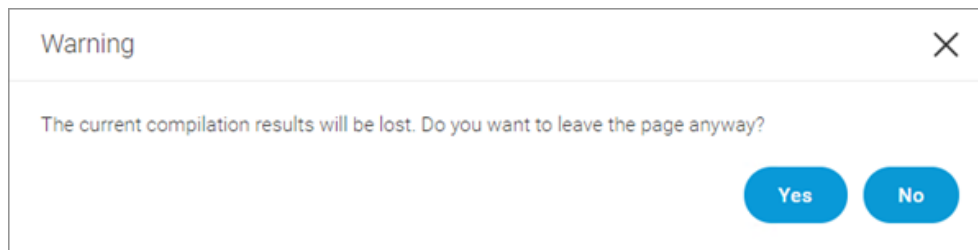
About Compilation Results

One-Hour Limit

After a completed compilation, the results and associated download will only be available for one hour. After one hour, you will be prompted with an error message if you try to navigate within that page and you must start over.

Page Navigation

The results of the compilation are only available as long as that equipment page is displayed. If you choose another Equipment to configure, you will be presented with a warning that you will lose the results if you navigate away from the page. A popup is displayed that warns you of this and prompts you if you want to stay on the current page or not.



Downloading Your Compilation

Once your compilation has been downloaded, the **.ZIP** file will contain:

- A CompileLog.txt file that logged the EC-gfxProgram compilation process for error troubleshooting
- A Sequence of Operations and Testing Procedure in .RTF format if the equipment included them
- An EC-gfxProgram application if compilation was successful. If a Sequence of Operation was included with the equipment, it will automatically become the first page of the application.
- An Excel file replicating the Points List tab information displayed after a successful compilation
- A .CSV file of the Points List tab information in a normalized format
- An equipment drawing file in your specified format (.DWG, .VSDX, .PDF)

CHAPTER 3

Loading the SACV project on the controller

The SACV uses an advanced EC-*gfx*Program control block for air flow calculations. This block is found in the Smart Air Control Valve toolbox, which is included in the SACV project package output by Builder.

NOTE

To ensure the full functionality of the SACV unit, always use the version of the Smart Air Control Valve toolbox found in the package output by Builder prior to starting EC-*gfx*Program and running the SACV application code.

General Information

For the SACV block to be available in EC-*gfx*Program, the SACV toolbox needs to be installed. Once installed, the block will be available for use in the Toolbox Code Library of EC-*gfx*Program.

To install the SACV toolbox:

1. Locate the .zip file downloaded from Builder in your computer's **Downloads** folder and extract its content.

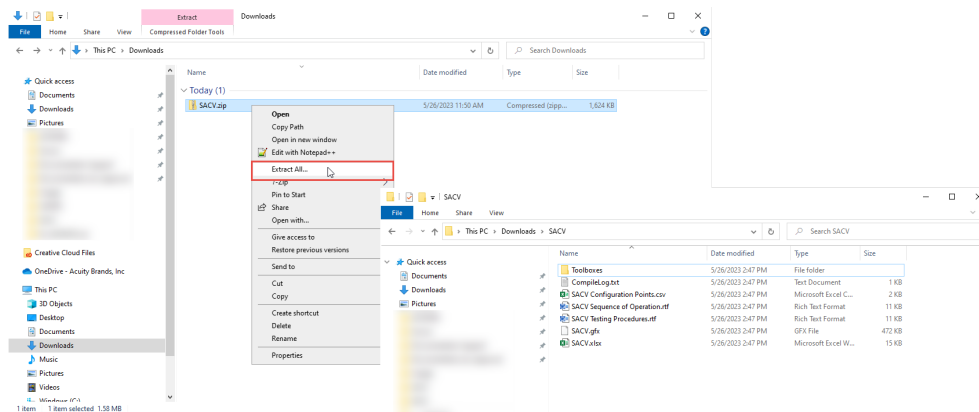
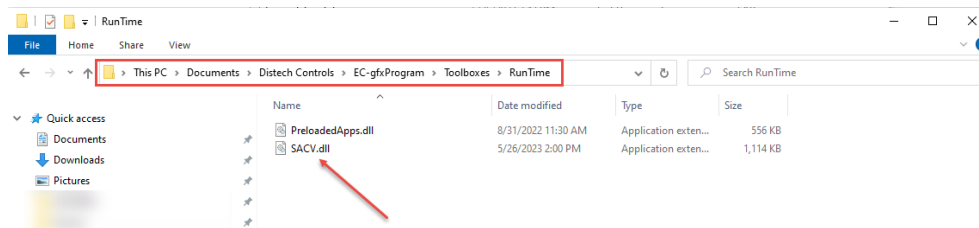


Figure 4: Extracting the output folder content (file name and content may vary based on your selection in Builder)

2. Copy the *Smart Air Control Valve.dll* file found in the **SACVToolboxes** folder and paste it in the C:\Users\UserName\Documents\Distech Controls\EC-*gfx*Program\Toolboxes\Design folder. If you are prompted to replace the file, click **Yes**.



WARNING

If you have the Productivity Enhancement Tools installed on your computer, you must delete the *Smart Air Control Valve.dll* file from the **Design** and **Runtime** folders located in C:\Users\UserName\Documents\Distech Controls\EC-gfxProgram\Toolboxes\. If you do not delete this file from this location, you will have two different versions of the SACV toolbox in your EC-gfxProgram Code Library.

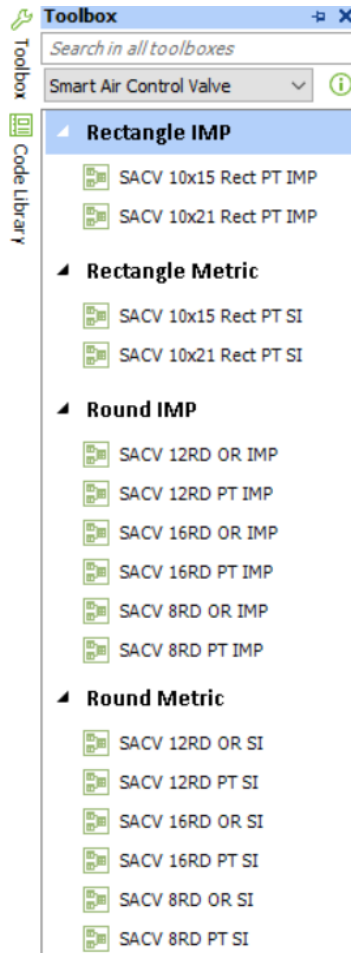


Figure 5: The SACV toolbox in EC-gfxProgram

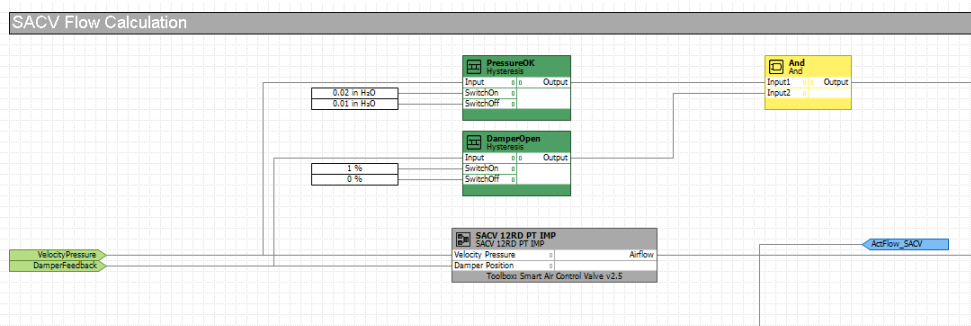


Figure 6: EC-gfxProgram code with SACV toolbox installed

For more information on how to add or remove toolboxes in EC-gfxProgram, refer to the *Toolbox Builder Tool* section of the *EC-gfxProgram User Guide*.

Loading the Application Code on the Controller

The SACV is shipped with a generic factory-programmed SACV application. For additional options, Builder and EC-*gfx*Program should be used to generate the new code and upload it to the controller, respectively.

1. You can open EC-*gfx*Program for the SACV controller through XpressNetwork Utility or through the controller's web interface.

Refer to the [Smart Air Control Valve Installation Guide](#) for more information on how to connect to the controller.

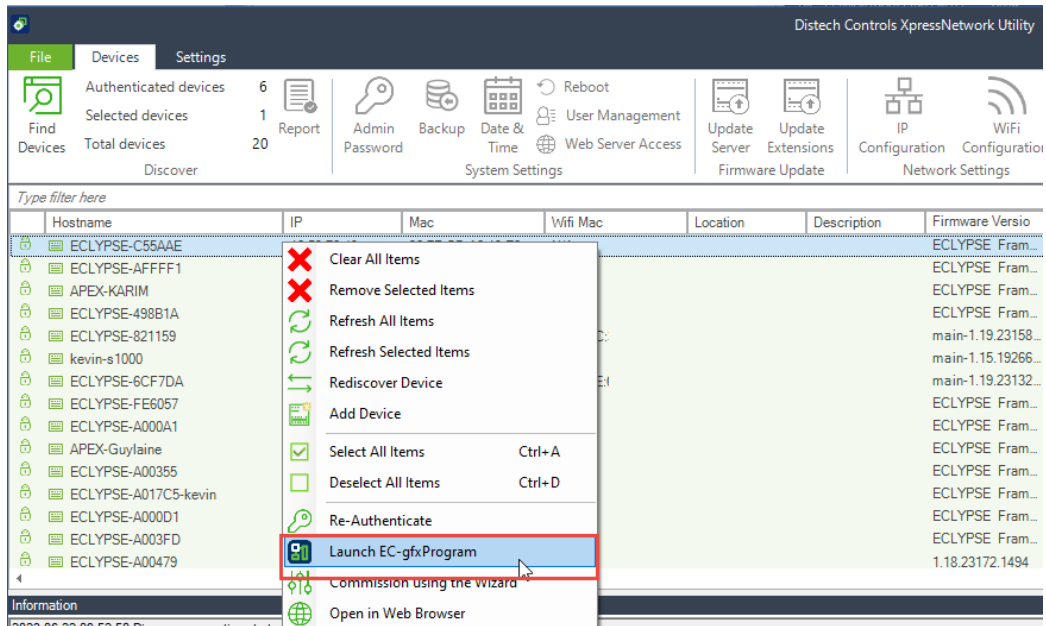


Figure 7: Accessing EC-*gfx*Program from XpressNetwork Utility

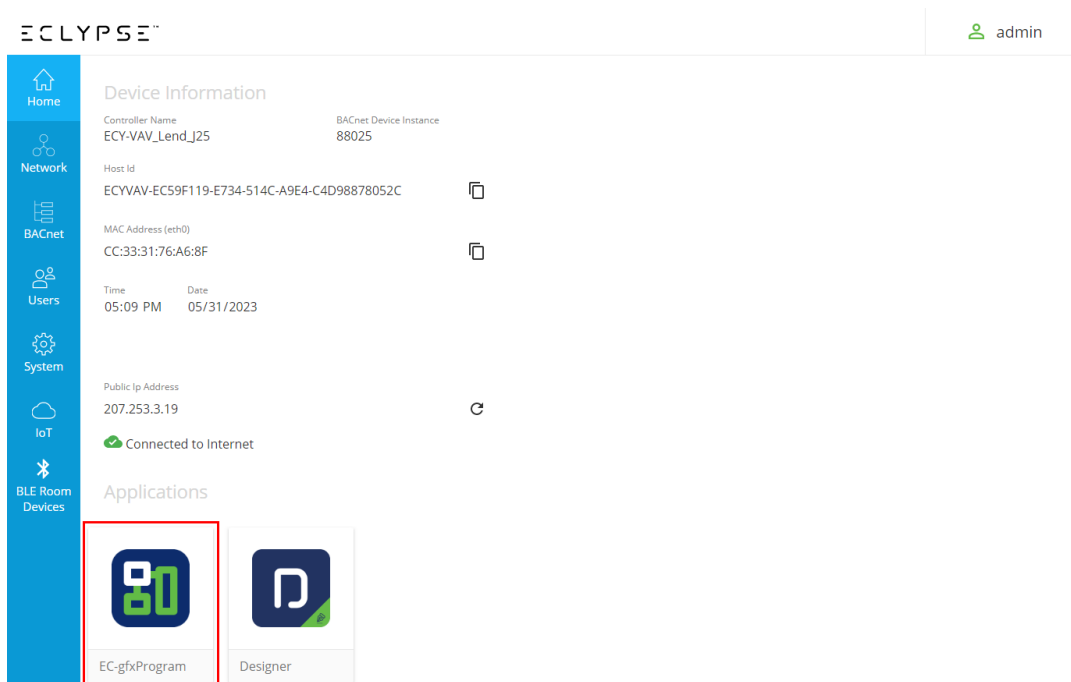
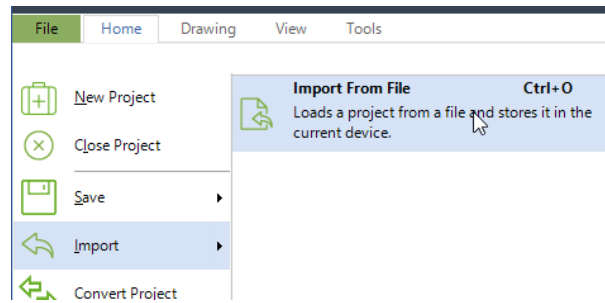


Figure 8: Accessing EC-*gfx*Program from the controller's Web interface

2. In EC-gfxProgram, open the File menu and select **Import > Import from File**.



3. In the file browser, navigate to the unzipped Builder output folder and select the .gfx project file. Click **OK**.
4. If you want to save the code that was previously in the project, click **Yes** when prompted. Otherwise, click **No**.
The custom SACV code from Builder will replace the existing code in EC-gfxProgram.
5. Click the **Synchronize** button to access the Project Synchronization window.
6. Select Download to device and check all Synchronization Options and click **Next**.
See the [EC-gfxProgram User Guide](#) for more information on project synchronization options.

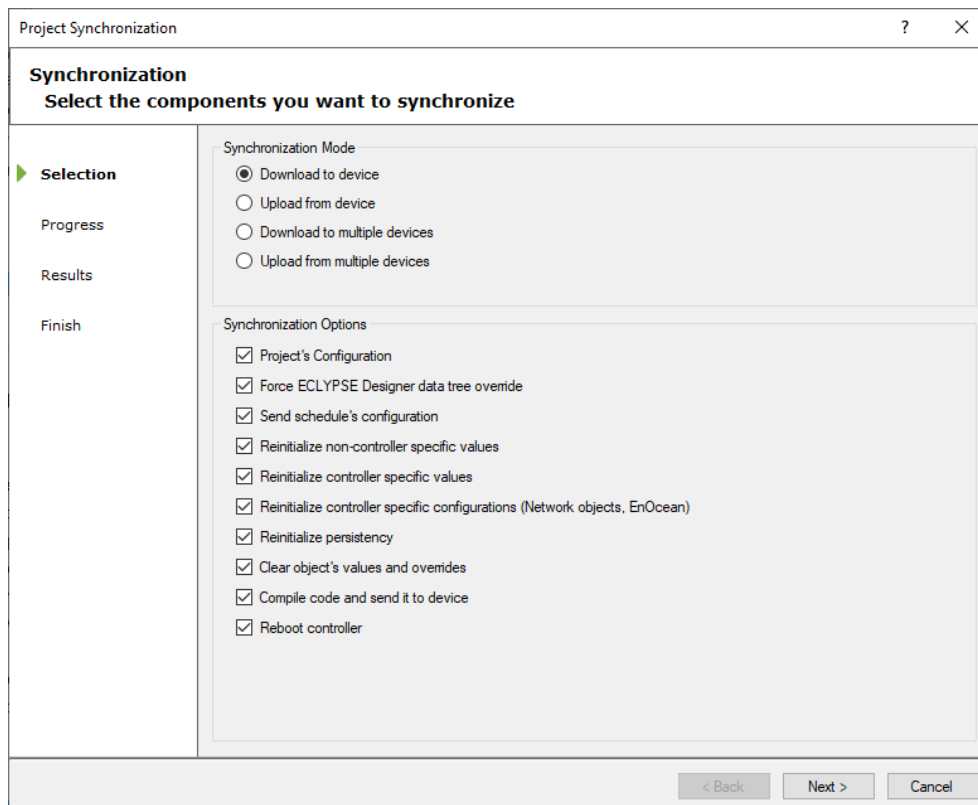


Figure 9: Project Synchronization window

7. Allow the Synchronization process to complete, click **Next** and then **Finish**.

Troubleshooting

If the controller is being serviced by a computer without the proper version of the SACV toolbox installed, the EC-*gfx*Program code will break and will resemble the example below. If this is the case, please update to the most recent version of the SACV toolbox and restart EC-*gfx*Program. Once updated, the block will now be available in the toolbox and the existing code will be functional.

Message	Location
1 Unable to find object type "HVACnfg.SmartAirControlValve.SACV10x15RectPT3MP" in toolbox "Smart Air Control Valve".	AirFlowCtrl/SACV Flow Calculation/SACV 10x15 Inch Rect PT
2 Unable to find object type "HVACnfg.SmartAirControlValve.SACV10x21RectPT3MP" in toolbox "Smart Air Control Valve".	AirFlowCtrl/SACV Flow Calculation/SACV 10x21 Inch Rect PT
3 Unable to find object type "HVACnfg.SmartAirControlValve.SACV12RDOR3MP" in toolbox "Smart Air Control Valve".	AirFlowCtrl/SACV Flow Calculation/SACV 12 Inch Round OR
4 Unable to find object type "HVACnfg.SmartAirControlValve.SACV12RDPT3MP" in toolbox "Smart Air Control Valve".	AirFlowCtrl/SACV Flow Calculation/SACV 12 Inch Round PT
5 Unable to find object type "HVACnfg.SmartAirControlValve.SACV16RDOR3MP" in toolbox "Smart Air Control Valve".	AirFlowCtrl/SACV Flow Calculation/SACV 16 Inch Round OR
6 Unable to find object type "HVACnfg.SmartAirControlValve.SACV16RDPT3MP" in toolbox "Smart Air Control Valve".	AirFlowCtrl/SACV Flow Calculation/SACV 16 Inch Round PT
7 Unable to find object type "HVACnfg.SmartAirControlValve.SACV8RDOR3MP" in toolbox "Smart Air Control Valve".	AirFlowCtrl/SACV Flow Calculation/SACV 8 Inch Round OR
8 Unable to find object type "HVACnfg.SmartAirControlValve.SACV8RDPT3MP" in toolbox "Smart Air Control Valve".	AirFlowCtrl/SACV Flow Calculation/SACV 8 Inch Round PT

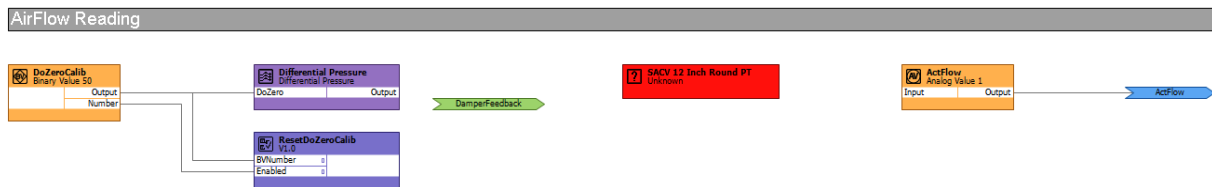


Figure 10: EC-*gfx*Program without the SACV toolbox installed or an out of date version

CHAPTER 4

Using the SACV Graphical Web Interface

This chapter explains how to use the SACV Graphical Web Interface. Various aspects of the interface are explained, including configuring the SACV settings, and working trends and alarms.

Accessing the SACV Graphical Web Interface

There are two ways to access the SACV Graphical Web Interface:

- In a Web browser, enter the following address: **https://< SACV IP address >/eclipse/envysion/viewer.html?proj=SACV_53BE&path=Index.dg5**. When prompted, enter your credentials to log into the controller.
- On the SACV controller's configuration Web Interface, click the **Designer** button and select the SACV project in the pop-up list. Click **OK**.

Make sure that the URL of the Designer loading page includes “&path=Index.dg5” at the end. If it does not, add it and reload the page.

The screenshot shows the Eclipse SACV configuration web interface. The top navigation bar includes the Eclipse logo and a user profile for 'admin'. A left sidebar contains navigation icons for Home, Network, BACnet, Users, System, IoT, and BLE Room Devices. The main content area is titled 'Device Information' and displays the following details:

Controller Name	BACnet Device Instance
ECY-VAV_Lend_J25	88025
Host Id	ECYVAV-EC59F119-E734-514C-A9E4-C4D98878052C
MAC Address (eth0)	CC:33:31:76:A6:8F
Time	Date
05:09 PM	05/31/2023
Public Ip Address	207.253.3.19
Connected to Internet	

Below the Device Information section is the 'Applications' section, which contains two buttons: 'EC-gfxProgram' and 'Designer'. The 'Designer' button is highlighted with a red border.

Figure 11: The Designer button on the Home page of the SACV's configuration web interface can be used to access the Graphical Web Interface

The SACV Graphical Web Interface, similar to the figure below, opens when accessing Designer for an SACV controller.

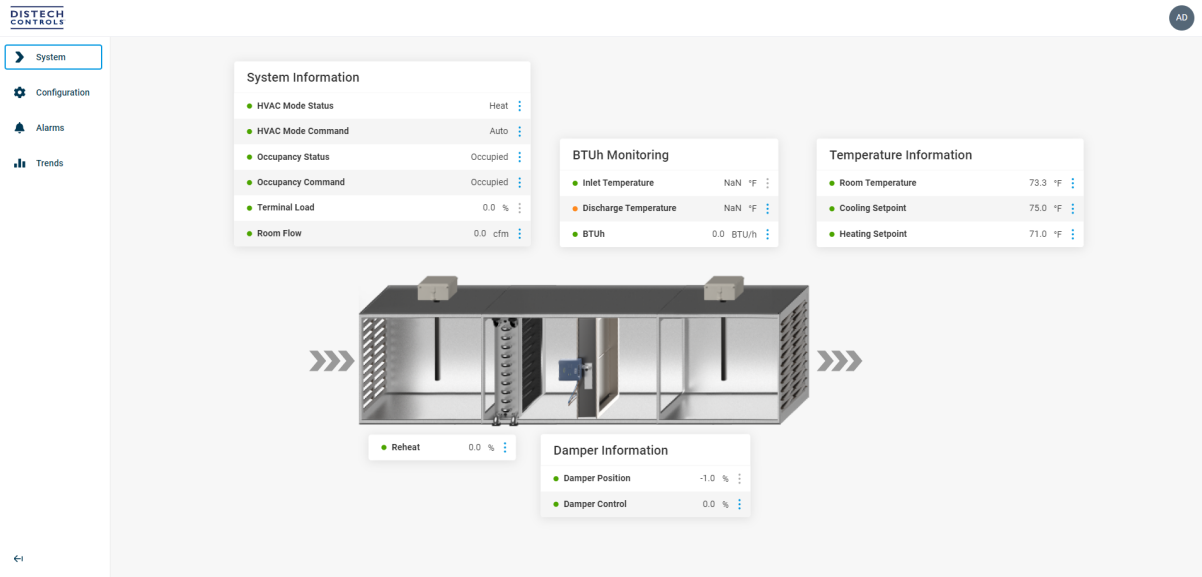


Figure 12: SACV Graphical Web Interface (System Page view)

Note

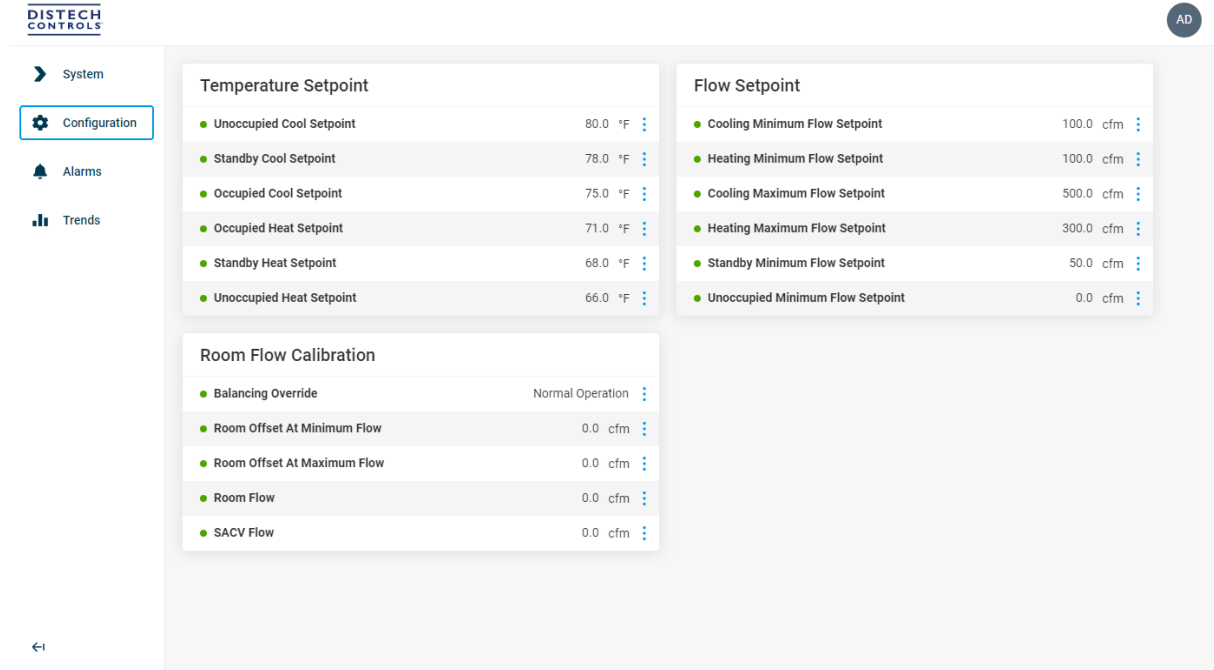
Rectangular SACV models that are equipped with hydronic reheat coils include a BTU/h calculation to estimate the energy transfer and consumption through the unit.

For more information regarding the different ways to access the configuration Web Interface, refer to the [Smart Air Control Valve Installation Guide](#).

Configuring the SACV

The SACV's space setpoints can be set from the configuration group of tables in the **Configuration** page. This page can easily be accessed from the SACV navigation menu located at the left of the system view page.

Each parameter can be easily set by clicking the vertical three-dot menu on the right of each point.



Configuring the Temperature Setpoints

The Temperature Setpoint table in the **Configuration** page contains the heating and cooling setpoints for the unoccupied, standby and occupied modes.

Temperature Setpoint	
● Unoccupied Cool Setpoint	80.0 °F
● Standby Cool Setpoint	78.0 °F
● Occupied Cool Setpoint	75.0 °F
● Occupied Heat Setpoint	71.0 °F
● Standby Heat Setpoint	68.0 °F
● Unoccupied Heat Setpoint	66.0 °F

Setpoints (heating/cooling)	Description
Unoccupied	The limits between which the temperature is to be maintained by the controller when it is in Unoccupied mode. If the temperature passes these limits, the system reacts to bring the temperature back within these limits. In Unoccupied mode, the space temperature is usually allowed a larger amount of variance than in Occupied mode, thereby lowering operating costs.
Occupied	The limits between which the temperature is to be maintained by the controller when it is in Occupied mode. This temperature range should be comfortable to building occupants.
Standby	The limits between which the temperature is to be maintained by the controller when it is in Standby mode. In Standby mode, the temperature is usually allowed a larger amount of variance than in Occupied mode. Still, it is maintained at a value close enough to the occupied setpoints so that it can be varied quickly for occupancy.

Calibrating the SACV Room Flow

The SACV room airflow balancing can be performed from the **Flow Setpoints** and **Room Flow Calibration** tables in the **Configuration** page. This page can easily be accessed from the SACV navigation menu located on the left of the system view page.

Each parameter can be easily set by clicking the vertical three-dot menu on the right of each point.

Configuring the Flow Setpoints

Flow Setpoint		
● Cooling Minimum Flow Setpoint	100.0 cfm	⋮
● Heating Minimum Flow Setpoint	100.0 cfm	⋮
● Cooling Maximum Flow Setpoint	500.0 cfm	⋮
● Heating Maximum Flow Setpoint	300.0 cfm	⋮
● Standby Minimum Flow Setpoint	50.0 cfm	⋮
● Unoccupied Minimum Flow Setpoint	0.0 cfm	⋮

Parameter	Description
Cooling Minimum	Minimum cooling flow setpoint
Heating Minimum	Minimum flow setpoint when duct heater is active
Cooling Maximum	Maximum cooling flow setpoint
Heating Maximum	Maximum flow setpoint during heating mode
Standby Minimum	Minimum flow setpoint during standby mode
Unoccupied Minimum	Minimum flow setpoint during unoccupied mode

Performing SACV Airflow Calibration

The SACV's airflow calibration can be set from the **Room Flow Calibration** table **Configuration** page

Room Flow Calibration		
● Balancing Override	Normal Operation	⋮
● Room Offset At Minimum Flow	0.0 cfm	⋮
● Room Offset At Maximum Flow	0.0 cfm	⋮
● Room Flow	0.0 cfm	⋮
● SACV Flow	0.0 cfm	⋮

Parameter	Description
Balancing Override	The balancing override setting. Different values can be selected: normal, minimum flow, minimum flow heat, minimum flow cool, maximum flow cool, maximum flow heat, 75% maximum flow, 80% maximum flow, 85% maximum flow, 90% maximum flow, 95% maximum flow, damper full open, damper full close, and damper initialization.
Room Offset At Minimum Flow	The offset to account for duct leakage when the SACV is operating at minimum flow.
Room Offset At Maximum Flow	The offset to account for duct leakage when the SACV is operating at maximum flow.
Room Flow	The actual flow (in cfm) in the room.
SACV Flow	The flow reading for the SACV controller.

The following steps outline the procedure for performing field adjustments on an SACV controller to account for any duct leakage:

1. Set the SACV's **Balancing Override** setting to **GoToMinFlow**.
2. Using a flow hood, measure the actual airflow and compare the reading with the **SACV Flow** value.
NOTE: Before taking any airflow measurements, make sure the flow hood has been properly calibrated using an appropriate method, such as the Traverse method.
3. Set the **Room Offset at Minimum Flow** based on the difference between the flow hood reading and the **SACV Flow** value (Room Offset = Room Flow – SACV Flow). Room offset values can be positive or negative.
4. Set the SACV's **Balancing Override** setting to **GoToMaxFlowCool**.
5. Using a flow hood, measure the actual airflow and compare the reading with the **SACV Flow** value.
6. Set the **Room Offset at Maximum Flow** based on the difference between the flow hood reading and the **SACV Flow** value.
7. Using a flow hood, validate that the **Room Flow** value is now equal to the flow hood reading.

Working with Alarms

The **Alarm Console** allows you to view and acknowledge active alarms. The alarm information is presented in different columns as shown in the figure below. The total amount of alarms and unacknowledged alarms are available at a glance at the top right corner of the **Alarm Console** window. More alarm information can be displayed by moving the cursor over the question mark symbol next to each alarm.

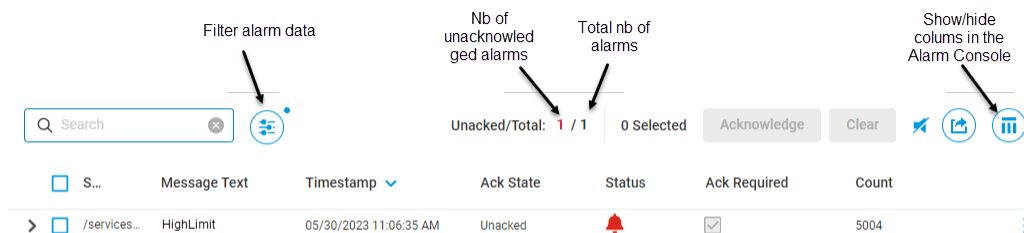


Figure 13: Alarm Console

Show/Hide Alarm Data Columns

The **Column Display** menu in the **Alarm Console** is used to show or hide additional columns of alarm data. Use the checkbox to select or deselect data columns.

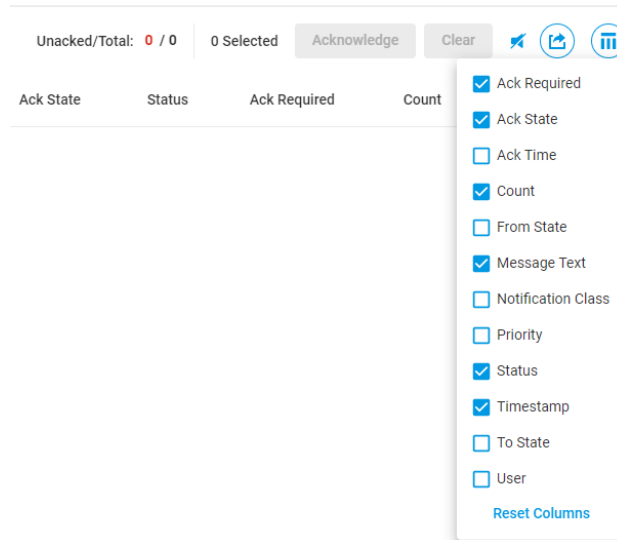






Figure 14: Show/hide data columns

Column	Information Displayed
Ack Required	True or False to indicate whether or not an acknowledgement is required for this alarm.
Ack State	“Acked” or “Unacked” to indicate whether the alarm has been acknowledged or Not.
Ack Time	Time that the alarm was acknowledged (if applicable).
Count	The number of alarms for the given source. The table lists old alarms too, hence the count.
From State	State of the object prior to the occurrence of the event that initiated this notification.
Message Text	Text message pertaining to the alarm.
Notification Class	Notification class of the event.
Priority	Priority number of the alarm.
Status	 The alarm is active and unacknowledged.  The alarm was acknowledged but is still active.  The alarm was acknowledged and is no longer active.  The alarm was not acknowledged but is no longer active.
Timestamp	Time and date when alarm event occurred.
Source	Alarm source name.
To State	State of the object after the occurrence of the event that initiated this notification.
User	Name of the user that acknowledged the alarm.

Filter Options

The **Filter Options** menu in the **Alarm Console** is used to sort the alarms in such a way as to hide or unhide certain alarms from the list. This filter action only affects which alarms to display, it does not edit any alarm information.

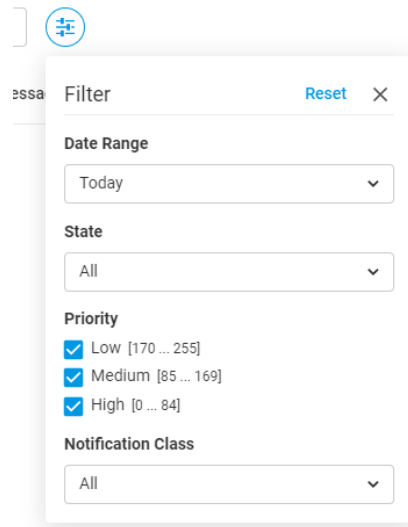


Figure 15: Filter options

The following filter options are available.

Column	Information Displayed
Date Range	Display the alarms that match the selected date range: All, Today, This Week, This Month, or This Year.
State	Display only the alarms that are acknowledged, unacknowledged, or both.
Priority	Display the alarms that match the selected alarm priority: Low, Medium, High, or All priorities.
Notification Class	Display the alarms that match the selected notification class.

Working with Trends

The SACV Graphical Web Interface allows you to view the available trends by plotting the data of the selected trends on a chart, along the x and y axes. When **Trends** is selected from the main menu, the **Trend Builder** is displayed. A list of available trends is provided. You can select a color for each trend that you wish to plot on the graph to facilitate the viewing of many trends at the same time. You can search for a particular trend from a long list of trends, by typing the trend name in the filter field provided just above the list of available trends.

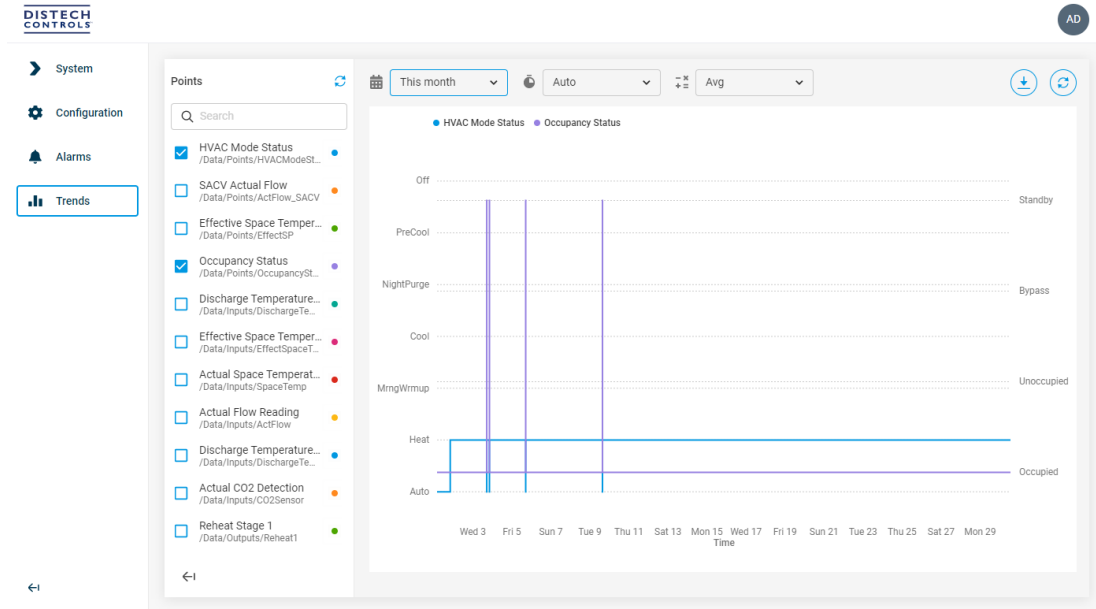


Figure 16: Trend Builder

The **Trend Builder** provides additional functions such as selecting different filter options such as selecting a time range, default intervals, and typing text in a filter field.

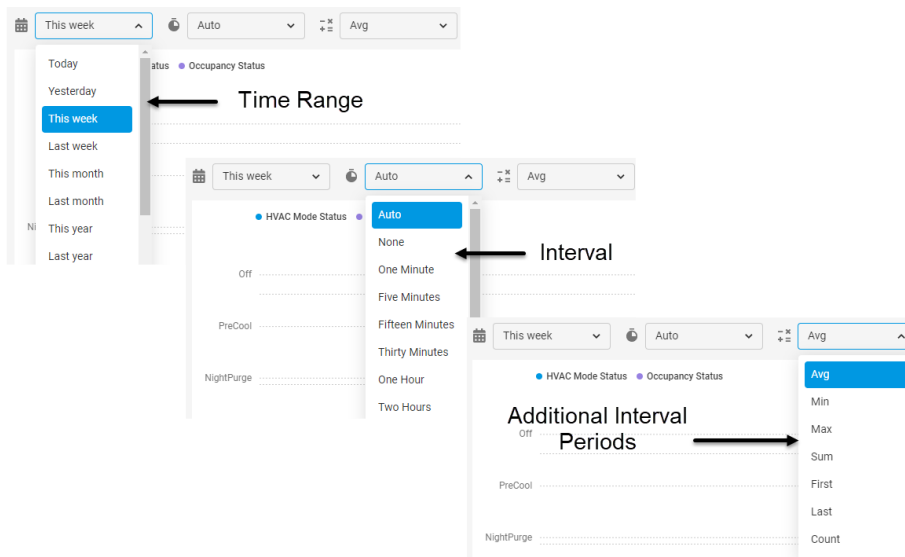


Figure 17: Trend builder filter options

Option	Description
Time range	Select a time parameter option from the list (today, last week, etc.)
Interval	Select a default interval of time that is used to determine what and how data is presented in your trend chart. For example, an interval value of 1 hour will present data at a granularity level of every one hour, while an interval value of 15 minutes will show data for every 15 minutes of logged data.
Additional interval periods	In addition, you can also select other interval options such as Avg (average value for the selected interval period), Min or Max (minimum or maximum value for the selected interval period), Sum (total of the values in the selected interval period), etc.

