ECL-VAV Series Preloaded Applications

User Guide

DISTECH CONTROLS™

Innovative Solutions for Greener Buildings™

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Version 1.0 – Initial Release – March 2012
Version 1.1 – Added the Occupancy Sensor Hold Time option in the system configuration

ECL-VAV Series Preloaded Applications - User Guide v1.1
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CHAPTER 1
INTRODUCTION

In the first chapter, the ECL-VAV preloaded applications are introduced and an overview of this user guide is provided.

In This Chapter

Introduction to the ECL-VAV Series Preloaded Applications

Distech Controls' ECL-VAV Series controllers come preloaded with code containing standard VAV applications. This code was created using EC-*gfx*Progam, a Graphical Programming Interface (GPI) tool that enables visual assembly of building blocks and the design of custom programs that control Building Automation Systems.

A controller's preloaded applications can be configured using dc *gfx*Applications, an application that is accessible through EC-Net^{AX} Pro, which is powered by the Niagara^{AX} Framework®. dc *gfx*Applications provides an intuitive interface for configuring controllers.

Alternatively, an Allure™ EC-Smart-Vue can be used to configure a controller's preloaded applications on site. The Allure EC-Smart-Vue series communicating sensor features a backlit display and graphical menus. This sensor can be used for indoor temperature measurement, setpoint adjustment, and occupancy state override. An Allure EC-Smart-Vue can also be used to perform system air balancing without requiring an onsite controls engineer and to commission the system.

Controllers can also be custom-programmed using EC-*gfx*Program through either EC-Net^{AX} Pro which is powered by the Niagara^{AX} Framework® or through any LNS®-based software such as Distech Controls' Lonwatcher 3. This allows you to quickly and easily create your own control sequences capable of meeting the most demanding requirements of any engineering specification.

In the first table below, the ECL-VAV Series controllers are listed as well as their characteristics. In the second table, the recommended applications for each model are presented.

ECL-VAV Series Characteristics					
	ECL-VAVS-O	**ECL-VAVS**	**ECL-VAV**	**ECL-VVTS**	**ECL-VAV-N**
Points	5-Point VAV	7-Point VAV	12-Point VAV	6-Point VVT	11-Point VAV
Universal hardware inputs	0	2	4	2	4
Built-in flow sensor	√	√	√		√
Allure EC-Smart-Vue support	4	4	4	4	4
Wireless inputs[1]	18	18	18	18	18
15 Vdc Power Supply			√		√
Universal output	1	1	2	1	2
Digital (triac) outputs	2	2	4	2	4
Built-in Actuator	√	√	√	√	

1. Available when a Wireless Receiver is connected to the controller.

Recommended Applications					
	ECL-VAVS-O	**ECL-VAVS**	**ECL-VAV**	**ECL-VVTS**	**ECL-VAV-N**
Cooling Only VAV Box	√	√		√	
Cooling w/ Reheat VAV Box	√	√		√	
Cooling w/ Reheat VAV Box & Perimeter Heating			√		
Parallel Fan VAV Box			√		
Series Fan VAV Box			√		
Dual Duct VAV Box[1]	√	√			
Large Damper VAV Box[2]					√
Existing Damper Actuator					√
Room Pressurization			√		

1 Two controllers are required or one controller with an external flow sensor and actuator.

2 Requiring More Than 35 in-lb (4 Nm) Actuator Torque.

About This User Guide

Purpose of the User Guide

This user guide is intended to provide information and instruct a user to configure an ECL-VAV Series controller from its preloaded applications using either dc *gfx*Applications or an Allure EC-Smart-Vue. However, this guide is not designed to instruct the user on how to use an ECL-VAV Series controller. For information on this controller series, refer to its datasheet and to the EC-*gfx*Progam user guide, both of which are available on the *Distech Controls website*.

- This user guide only explains hardware installation in a general sense. Please refer to the individual device's installation guides for specific hardware installation information.
- This user guide does not provide and does not intend to provide instructions for safe wiring practices. It is the user's responsibility to adhere to the safety codes, safe wiring guidelines and safe working practices of the local area. This user guide does not intend to provide all the information and knowledge of an experienced HVAC technician or engineer.

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 installing and configuring the devices specified in this user guide have prior training in the usage of these devices.

Conventions Used in this Document

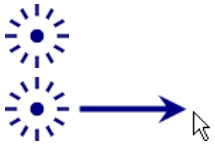
Notes

This is an example of Note text. Wherever the note-paper icon appears, it means the associated text is giving a time-saving tip or a reference to associated information of interest.

Cautions and Warnings

This is an example of Caution and Warning text. Wherever the exclamation icon appears, it means that there may be an important safety concern or that an action taken may have a drastic effect on the device, equipment, and/or network if it is done improperly.

Conventions for Using the Mouse



Click the item.

Click, drag, and release the item.

Acronyms and Abbreviations Used in this Document

Table 1-1: Acronyms and Abbreviations

Acronym	Definition
AO	Analog Output
BACnet®	Building Automation and Control Networking Protocol
CUSUM	Cumulative Sum Control Chart
DO	Digital Output
LAN	Local Area Network
LON	Local Operating Network
MAC	Media Access Control
NCI	Network Configuration Inputs
NVI	Network Variable Input
NVO	Network Variable Output
PWM	Pulse Width Modulation
SP	Setpoint
TRIAC	Triode for Alternating Current
VAV	Variable Air Volume
VPACC	VAV Performance Assessment Control Charts
VVT	Variable Volume and Temperature

CHAPTER 2
SEQUENCE OF OPERATION

This chapter presents various aspects of the sequence of operation of an ECL-VAV Series controller. Topics covered include occupancy control, temperature setpoints, HVAC modes, airflow control, heat control, and fan control.

In This Chapter

Occupancy Control, Temperature Setpoints, and HVAC Modes

In this section, various parts of the ECL-VAV Series sequence of operation are presented, including occupancy control, space temperature setpoints and HVAC modes.

Occupancy Control

There are six variables that control occupancy and each are described in the following table:

Variable	Description
nviSchedule_1	Occupancy received from the network. If no update is received from the network for more than the network variable Max Receive Time (default = 600 sec), nviSchedule_1 will not be used to control nvoEffectOccup.
nviSystemToVav.Occupancy.current_state	Occupancy received from the network. If nviSchedule_1 is not bound then the system will use this network variable to control nvoEffectOccup. If no update is received from the network for more than the network variable Max Receive Time (default = 600 sec), nviSystemToVav.Occupancy.current_state will not be used to control nvoEffectOccup.
nviOccManCmd	Occupancy manual override received from the network. This variable has precedence over nviSchedule_1 and nviSystemToVav.Occupancy.current_state.
nvoVAVStatus1.OccupDetect[1]	Current status from a motion detection sensor. When configured, nvoEffectOccup is set to standby mode when nviSchedule_1 or nviSystemToVav.Occupancy is in occupied mode. Once motion is detected nvoEffectOccup is set to occupied for the nciConfig5.HoldTime period.
nvoVAVStatus1.WindowContact[1]	Current status of a window dry contact. When configured, nvoEffectOccup is set to unoccupied mode when the window is open regardless of the other occupancy variables.
nvoEffectOccup	This variable is derived from the five variables listed above. The occupant can force the system into Bypass mode during unoccupied and standby modes via the room sensor. The override delay can be adjusted through nciConfig5.BypassTime. If none of the three above nvis are bound, nvoEffectOccup will default to occupied mode.

1. Does not apply to the ECL-VAVS-O model

Space Temperature Setpoints

The Space Temperature setpoints consist of six configuration setpoints, three network variables, and one setpoint adjustment variable. These setpoints are described in the following table:

Variable	Description
nciSetpoints.UnoccupiedCool	Cooling setpoint during unoccupied mode
nciSetpoints.StandbyCool	Cooling setpoint during standby mode
nciSetpoints.OccupiedCool	Cooling setpoint during occupied mode
nciSetpoints.OccupiedHeat	Heating setpoint during occupied mode
nciSetpoints.StandbyHeat	Heating setpoint during standby mode
nciSetpoints.UnoccupiedHeat	Heating setpoint during unoccupied mode
nviSetpoint	Network variable used to change occupied and standby setpoints via the network.
nviSystemToVav.SpaceSetpoint	Same as nviSetpoint, however when nviSetpoint is between 10°C(50°F) and 35°C(95°F) this network variable is not used.
nviSetPtOffset	Network variable used to shift the occupied and standby setpoints via the network. This variable is added to the effective Occupied and Standby setpoints.
SetpointOffset	The final setpoint offset is calculated based on the nviSetPtOffset, and the setpoint offset on hardware input 2 or an Allure EC-Smart-Vue if configured. *SetpointOffset = nviSetPtOffset + (Input 2 or EC-Smart-Vue setpoint offset)*
nvoEffectCoolSP	The actual cooling setpoint is derived based on nvoEffectOccup, nciSetpoints, nviSetpoint and nviSetPtOffset *abs_setpoint_offset = nviSetpoint - (nciSetpoints.OccupiedCool + nciSetpoints.OccupiedHeat)/2* When nvoEffectOccup equals occupied or bypass mode: *nvoEffectCoolSP = nciSetpoints.OccupiedCool + abs_setpoint_offset + SetpointOffset* When nvoEffectOccup equals standby mode: *nvoEffectCoolSP = nciSetpoints.StandbyCool + abs_setpoint_offset + SetpointOffset* When nvoEffectOccup equals unoccupied mode: *nvoEffectCoolSP = nciSetpoints.UnoccupiedCool*
nvoEffectHeatSP	The actual heating setpoint is derived based on nvoEffectOccup, nciSetpoints, nviSetpoint and nviSetPtOffset. *abs_setpoint_offset = nviSetpoint - (nciSetpoints.OccupiedHeat + nciSetpoints.OccupiedHeat)/2* When nvoEffectOccup equals occupied or bypass mode: *nvoEffectHeatSP = nciSetpoints.OccupiedHeat + abs_setpoint_offset + SetpointOffset* When nvoEffectOccup equals standby mode: *nvoEffectHeatSP = nciSetpoints.StandbyHeat + abs_setpoint_offset + SetpointOffset* When nvoEffectOccup equals unoccupied mode: *nvoEffectHeatSP = nciSetpoints.UnoccupiedHeat*
nvoEffectSetpt	The effective setpoint reflects nvoEffectCoolSP or nvoEffectHeatSP depending on nvoUnitStatus.mode.

The dc *gfx*Applications interface and the Allure EC-Smart-Vue can both be used to adjust the heating and cooling setpoints.

For instructions on how to adjust the setpoints using the dc *gfx*Applications interface, see *Configuring the Space Temperature Setpoints* on page 27.

And for screen-by-screen steps on how to adjust the setpoints using an Allure EC-Smart-Vue, see *Adjusting the Setpoints and Display Units* on page *46*.

HVAC Modes

There are two variables that control the HVAC mode. It is described in the following table:

Variable	Description
nvoUnitStatus.mode	This variable is controlled by nviApplicMode. When nviApplicMode is set to Auto, nvoUnitStatus.mode reflects the room's actual terminal load.
nviApplicMode	This is the application mode received from the network. If no update is received from the network for more than the network variable Max Receive Time (default = 600 sec), nviApplicMode will be considered as Auto. The supported modes are: (-1)-Nul, (0)-Auto, (1)-Heat, (2)-Mrng Wrmup, (3)-Cool, (4)-Night Purge, (5)-Pre Cool, and (6)-Off.

Airflow Control and Calibration

In this section, the sequence of operation related to a controller's airflow control and calibration are presented.

Airflow Control (All models except ECL-VVTS)

There are six airflow configuration setpoint variables described in the following table:

Variable	Description
nciMinFlow	Absolute minimum flow setpoint during occupied mode.
nciMaxFlow	Maximum flow setpoint during cooling mode.
nciMinFlowHeat	Minimum flow setpoint when duct heater is active.
nciMaxFlowHeat	Maximum flow setpoint during heating mode.
nciMinFlowStby	Minimum flow setpoint during standby mode.
nciMinFlowUnocc	Minimum flow setpoint during unoccupied mode.

The actual flow setpoint, nvoEffectFlowSP, is calculated based on nciConfig1.BoxType and other control variables described in the subsections below.

Variable	Description
nviDuctInTemp	Using nviDuctInTemp and temperature setpoint average (nvoEffectCoolSP and nvoEffectHeatSP) the system evaluates whether the inlet temperature is suitable for cooling or heating the space. If nvoUnitStatus.mode is in morning warm up, the air is by default considered suitable for heating the space.
nviSystemToVav.DischargeTemp	Same as nviDuctInTemp however when nviDuctInTemp is between 0°C(32°F) and 100°C(212°F) this network variable is not used.

Single Duct VAV

The following sections describe the single duct VAV cooling and heating mode variables.

Cooling Mode

When the air is suitable for cooling the space, nvoEffectFlowSP varies between nciMinFlow and nciMaxFlow based on terminal load. Otherwise, when the air is too warm, nvoEffectFlowSP is by default equal to nciMinFlow.

When nvoEffectOccup is in unoccupied or standby mode, nciMinFlow is replaced by either nciMinFlowUnocc or nciMinFlowStby.

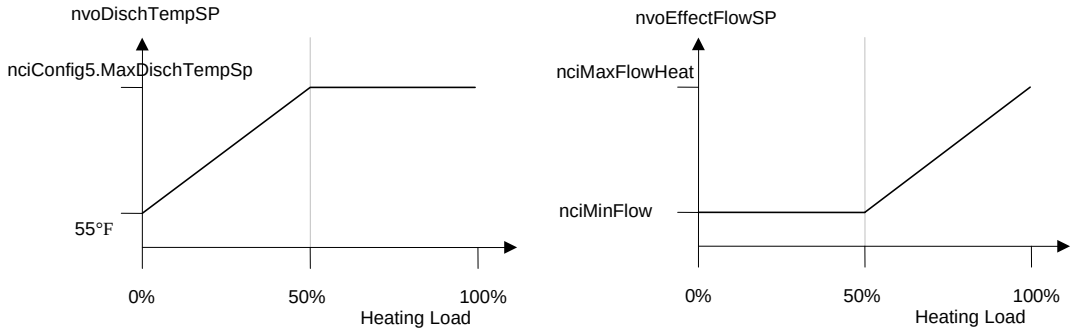
Heating Mode

When the air is suitable for heating the space, nvoEffectFlowSP varies between nciMinFlow and nciMaxFlowHeat. Otherwise, when the air is too cold, nvoEffectFlowSP is by default equal to nciMinFlow. Regardless, when duct heating is required, nciMinFlow is replaced by the highest value between nciMinFlow and nciMinFlowHeat.

When nvoEffectOccup is in unoccupied or standby mode, nciMinFlow is replaced by either nciMinFlowUnocc or nciMinFlowStby.

nciConfig1.VvtMode	When this option is selected, nvoEffectFlowSP is converted into a percentage, which controls the damper without using a flow reading.
nciConfig1.DualMaximum*	In heating mode, nvoEffectFlowSP is controlled by the following method. The first 50 percent of the heating load adjusts the nvoDischTempSP between 13°C (55°F) and nciConfig5.MaxDischTempSp. The second 50 percent of the heating load adjusts the nvoEffectFlowSP between nciMinFlowHeat and nciMaxFlowHeat.

* The dual maximum option requires a discharge temperature sensor to be configured. This sequence of operation respects California Title-24.



Discharge air setpoint is adjusted for first 50% of heating load

Actual flow setpoint is adjusted for remaining 50% of heating load

Figure 2-1: Heating Control with the Dual Maximum Option

Fan Powered VAV (ECL-VAV and ECL-VAV-N Models Only)

The tables below describe the Fan Powered VAV cooling and heating mode variables.

Cooling Mode

When the air is suitable for cooling the space, nvoEffectFlowSP varies between nciMinFlow and nciMaxFlow based on terminal load. Otherwise, when the air is too warm, nvoEffectFlowSP is by default equal to nciMinFlow.

When nvoEffectOccup is in unoccupied or standby mode, nciMinFlow and nciMinFlowHeat are replaced by either nciMinFlowUnocc or nciMinFlowStby

Heating Mode

When the air is suitable for heating the space, nvoEffectFlowSP varies between nciMinFlowHeat and nciMaxFlowHeat. Otherwise, when the air is too cold, nvoEffectFlowSP is by default equal to nciMinFlowHeat.

When nvoEffectOccup is in unoccupied or standby mode, nciMinFlow and nciMinFlowHeat are replaced by either nciMinFlowUnocc or nciMinFlowStby

When nciConfig1.VvtMode option is selected, nvoEffectFlowSP is converted into a percentage, which controls the damper without using a flow reading.

Flow Tracking Operation

To use the flow tracking operation mode, two variables must be used. The nvoEffectFlowSP can be nviAirFlowSetpt and nciFlowOffset, described in the table below:

nviAirFlowSetpt	When this network variable is between (0 l/s and 65534 l/s), the flow tracking operation mode is enabled.
nciFlowOffset	This network configuration input is added to the nviAirFlowSetpt to obtain the nvoEffectFlowSP.

For instructions on how to configure a controller's airflow setpoint parameters using the dc *gfx*Applications interface, see *Balancing the VAV* on page 30. And for screen-by-screen steps on how to configure the airflow setpoint parameters using an Allure EC-Smart-Vue, see *Configuring the Flow Setpoint Parameters* on page 57.

Airflow Control (ECL-VVTS Model Only)

There are six configuration setpoint variables. They are described in the table below.

Variable	Description
nciMinDamper	Absolute minimum damper position during occupied mode
nciMaxDamper	Absolute maximum damper position during cooling mode
nciMinDamperHeat	Minimum damper position when duct heater is active
nciMaxDamperHeat	Maximum damper position during heating mode
nciMinDamperStby	Minimum damper position during standby mode
nciMinDamperUnocc	Minimum damper position during unoccupied mode

The damper is controlled by DamperCmd and is based on the control variables described in the subsections below.

Variable	Description
nviDuctInTemp	Using nviDuctInTemp and temperature setpoint average (nvoEffectCoolSP and nvoEffectHeatSP) the system evaluates whether the inlet temperature is suitable for cooling or heating the space. If nvoUnitStatus.mode is in morning warm up, the air is by default considered suitable for heating the space.
nviSystemToVav.DischargeTemp	Same as nviDuctInTemp however when nviDuctInTemp is between 0°C(32°F) and 100°C(212°F) this network variable is not used

Cooling Mode

When the air is suitable for cooling the space, DamperCmd varies between nciMinDamper and nciMaxDamper based on terminal load. Otherwise, when the air is too warm, DamperCmd is by default equal to nciMinDamper.

When nvoEffectOccup is in unoccupied or standby mode, nciMinDamper is replaced by either nciMinDamperUnocc or nciMinDamperStby

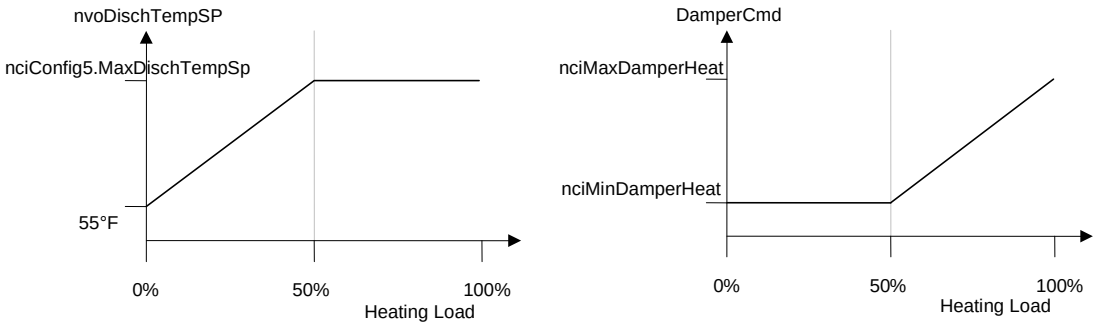
Heating Mode

When the air is suitable for heating the space, DamperCmd varies between nciMinDamper and nciMaxDamperHeat. Otherwise, when the air is too cold, DamperCmd is by default equal to nciMinDamper. Regardless, when duct heating is required, nciMinDamper is replaced by the highest value between nciMinDamper and nciMinDamperHeat.

When nvoEffectOccup is in unoccupied or standby mode, nciMinDamper is replaced by either nciMinDamperUnocc or nciMinDamperStby

nciConfig1.VvtMode	When this option is selected, DamperCmd is converted into a percentage, which controls the damper without using a flow reading
nciConfig1.DualMaximum*	In heating mode, DamperCmd is controlled by the following method. The first 50 percent of the heating load adjusts the nvoDischTempSP between 13°C (55°F) and nciConfig5.MaxDischTempSp. The second 50 percent of the heating load adjusts the DamperCmd between nciMinDamperHeat and nciMaxDamperHeat.

*The dual maximum option requires a discharge temperature sensor to be configured. This sequence of operation respects California Title-24.



Discharge air setpoint is adjusted for first 50% of heating load

Damper command is adjusted for remaining 50% of heating load

Figure 2-2: Heating Control with the Dual Maximum Option (ECL-VVTS only)

For instructions on how to configure a controller's airflow setpoint parameters using the dc *gfx*Applications interface, see *Balancing the VAV* on page 30. And for screen-by-screen steps on how to configure the airflow setpoint parameters using an Allure EC-Smart-Vue, see *Configuring the Flow Setpoint Parameters* on page 57.

Airflow Calibration

The actual flow, nvoAirFlow, is calculated using the differential pressure from the onboard sensor and the K-factor, nciKFactor

To calibrate the system, stabilize the flow by overriding either the flow setpoint or the damper position using nviFlowCommand. Once stabilized, read the flow hood measurement and set nciFlowCalib to the measured flow. The K-factor will automatically adjust to the proper value.

For instructions on how to perform VAV airflow balancing using the dc *gfx*Applications interface, see *Balancing the VAV* on page 30. And for screen-by-screen steps on how to perform VAV airflow balancing using an Allure EC-Smart-Vue, see *Performing VAV Airflow Balancing* on page 58.

Heat Control and Output Wiring

Depending on the controller model, up to three heating sources can be controlled. Configuration of these sources is done by the following variables:

- nciConfig3.Heat1Type
- nciConfig3.Heat2Type
- nciConfig3.Heat3Type (applies only to ECL-VAV model)

These variables allow the user to select the type of control signal used to drive the heating source. These variables must be configured in a specific order (i.e. nciConfig3.Heat1Type must be configured before nciConfig3.Heat2Type, and so on).

Each heat type has a normally open or normally closed configuration option, represented by the following variables:

- nciConfig3.Heat1_NO
- nciConfig3.Heat2_NO
- nciConfig3.Heat3_NO (applies only to ECL-VAV model)

Other relevant variables are described in the table below.

Variable	Description
nciConfig1.DuctHeatStgs	This variable determines the number of duct heaters that are installed. Duct heaters are always wired starting from nciConfig3.Heat1Type. If no duct heater or only perimeter heat is required, set this variable to "None". All heat types configured greater than nciConfig1.DuctHeatStgs are considered perimeter heaters.
nciConfig5.MaxOatDuctHeat	Outside air temperature limit to disable the duct heater(s).
nciConfig5.MaxOatPerimHeat	Outside air temperature limit to disable the perimeter heater(s).
nciConfig1.HeatPriority	Determines which heating source is activated first. Options are duct heater, perimeter heat or simultaneous.
nciConfig1.HotWaterReheat	Determines if hot water reheat is used. When in use, the nciMinFlowHeat safeguard is ignored.

Shedding

Shedding is based on the following variables:

Variable	Description
nviShedding	Load shedding option. A value of zero percent disables this feature.
nviSystemToVav.Shedding	Same as nviShedding, however when nviShedding is between 0 and 100 percent, this network variable is not used.
nciConfig5.SheddingOnSetpoint	When set to true, the nvoEffectHeatSP and nvoEffectCoolSP will be adjusted based on their corresponding occupied and standby setpoints: *nvoEffectHeatSP adjustment = (nciSetpoints.StandbyHeat - nciSetpoints.OccupiedHeat) * nviShedding / 100* *nvoEffectCoolSP adjustment = (nciSetpoints.StandbyCool - nciSetpoints.OccupiedCool) * nviShedding / 100* When set to false, a shedding value between 0 and 100 percent attenuates the total heat demand of the system.
nciConfig5.SheddingEnable	When set to false, all shedding is disabled regardless of all other values.

Wiring of outputs depends on the type of control signal used to drive the heating sources. For instructions on how to configure a controller's outputs using the dc *gfx*Applications interface, see *Configuring the Preloaded Applications* on page 33. And for screen-by-screen steps on how to configure a controller's outputs using an Allure EC-Smart-Vue, see *Setting Up Outputs* on page 52 and *Output Wiring (ECL-VAV)* on page 53.

Fan Control (ECL-VAV and ECL-VAV-N Models Only)

Depending on the type of fan powered box, the fan is controlled based on one of the two sequences below.

Series Fan

The fan is started by the following conditions:

- Occupancy is in occupied or bypass mode.
- Occupancy is in unoccupied or standby mode and duct heating is required.
- Occupancy is in unoccupied or standby mode where cooling is required and main air handling unit is active.

Note that the damper actuator is closed before starting the fan to prevent the fan from running backwards.

Parallel Fan

The fan is started by the following conditions:

- Duct heating is required.
- Main air flow is lower than nciPFanStartFlow during occupied or bypass period.

Note that for both types of fan powered boxes, the minimum on and minimum off delays prevent the fan from short cycling. Fan control always outputs on DO4, but for the ECL-VAV-N model, fan control can also output on AO6.

For screen-by-screen steps on how to select a controller's type of fan powered box, using an Allure EC-Smart-Vue, see *Configuring the VAV* on page 48.

VAV Performance Assessment Control Charts (VPACC)

The ECL-VAV VPACC feature, which is embedded into the ECL VAV control sequences, provides a means of automatically detecting when the VAV is operating outside of its design parameters.

In a traditional sequence of operations, alarms are triggered when the value of a point stays outside the alarm limit for a defined period of time. The VPACC improves on this, since it has the capability to set off a warning condition automatically should the system be unstable or consistently too high or low, even if the alarm points are never reached.

Additional benefits of the VPACC:

- Identify failure or unstable control where standard alarming would fail
- Track equipment control over a long period of time
- Identify failure before occupant complaints
- Monitor system only when in occupied mode
- Increase building efficiency
- Reduce major equipment replacement and emergency equipment replacement
- No need to program alarm in EC-BOS^{AX} or EC-Net^{AX} Pro.

VPACC Functionality

The example in Figure 2-3 shows that the airflow of a VAV is unstable. The VPACC feature can detect and diagnose this unstable control by evaluating the frequency of errors over time and producing an alarm should the frequency exceed the established parameters. The VPACC fault detection alerts can be viewed from the dc *gfx*Applications graphics pages and displayed in the EC-Net^{AX} Web pages. The VPACC is available with all VAV controllers and is used in your custom VAV sequence using *gfx*Applications code library.

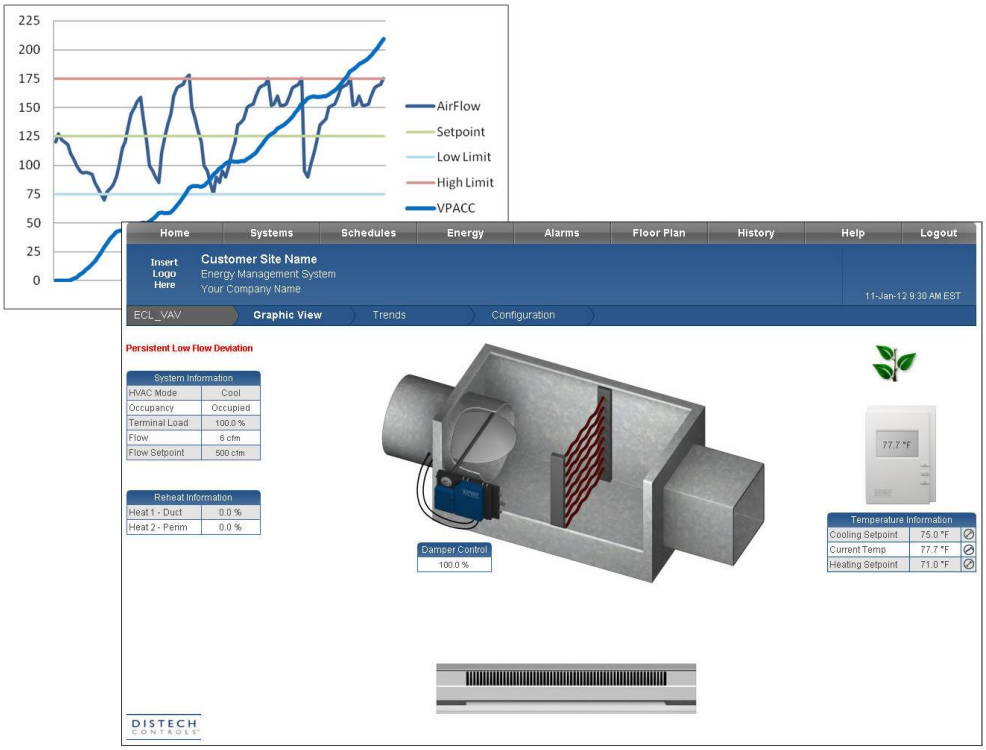


Figure 2-3: VPACC Functionality

The VPACC will measure the following fault detections:

- Persistent High/Low Space Temperature
- Persistent High/Low Discharge Temperature
- Persistent High/Low Air Flow
- Unstable Air Flow

VPACC Parameters

- nciConfig6
  - EnableDelayVPACC
  - CUSUM_K_VPACC
  - SpaceTempStdErr
  - SpaceTempErrAlmSP
  - AirFlowStdErr
  - AirFlowErrAlmSP
  - DischTempStdErr
  - DischTempErrAlmSp

- nvoVavStatus3
  - VPACCstatus
  - SpaceTempPosErr
  - SpaceTempNegErr
  - AirFlowPosErr
  - AirFlowNegErr
  - AirFlowAbsErr
  - DischTempPosErr
  - DischTempNegErr

CHAPTER 3
Using the dc *gfx*Applications

This chapter explains how to access the preloaded applications using EC-Net^{AX} Pro and how to navigate the dc *gfx*Applications interface. Various aspects of the dc *gfx*Applications interface are explained, including configuring the VAV settings and setting up trends to be followed.

In This Chapter

Accessing the Preloaded Applications with EC-Net^{AX} Pro

The ECL-VAV Series preloaded applications can be found in the *dcgfx*Applications palette. For information on how to prepare an EC-Net^{AX} station and how to install the *dcgfx*Applications palette in an EC-BOS^{AX}, refer to the *Productivity Enhancing Tools* User Guide.

To access the preloaded applications of an ECL-VAV Series controller, it must first be created in the BcpLonNetwork driver of the configured station and then matched with an existing device in the LON Network. The following procedure explains how to add devices to a configured station and then how to match them with existing devices in the network:

1. Open the *dcgfx*Applications palette.

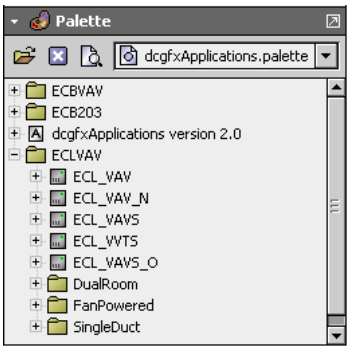


Figure 3-1: *dcgfx*Applications Palette

2. Click and drag the name of a controller model from the *dcgfx*Applications palette to the **BcpLonNetwork** driver of the configured station. Give the created device an appropriate name.

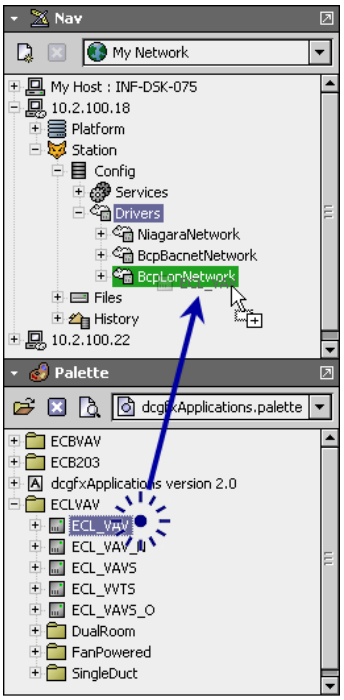


Figure 3-2: Adding a Device to the BcpLonNetwork Driver

To add multiple copies of the same device, right-click the device just added, click **Copy** and then right-click the **BcpLonNetwork** driver and click **Paste Special**.

Figure 3-3: Adding Multiple Copies of a Device

3. Double-click the **BcpLonNetwork** driver. The Bcp Lon Device Manager appears in the View pane.
4. Click **Discover**. The discovered devices appear in the View pane's top section and the LonNetwork database appears in the bottom section.

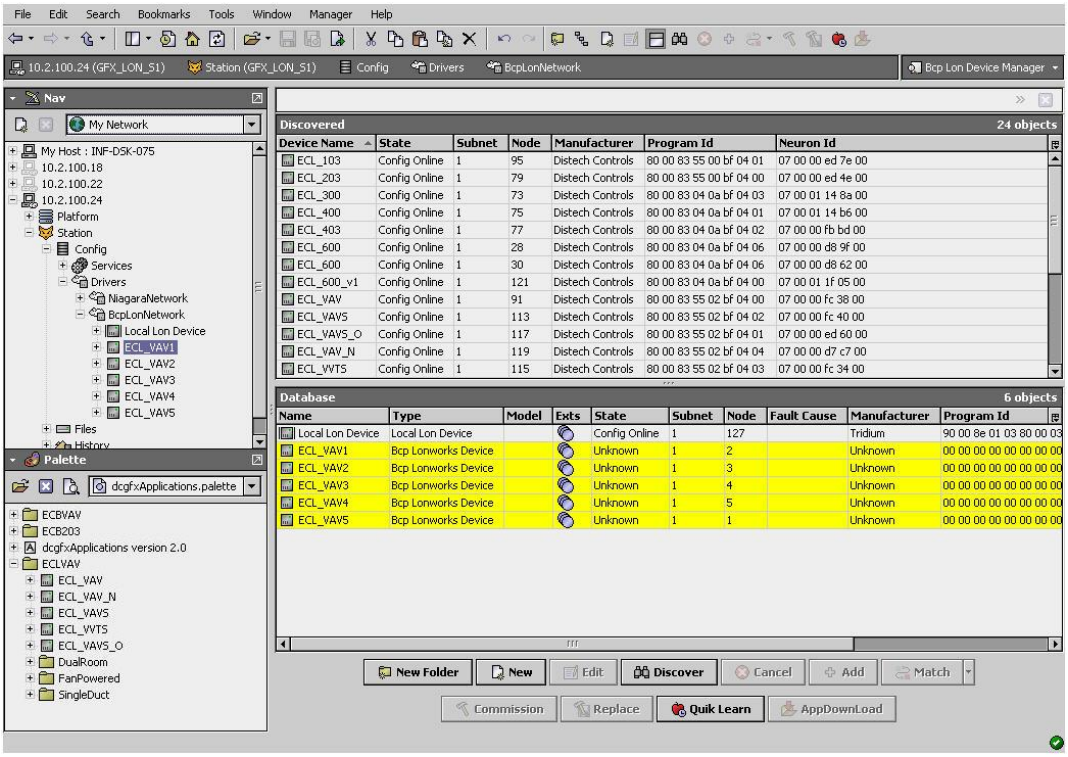


Figure 3-4: LON Network Discovered Devices

5. Select the discovered device that is to be matched with the one just added to the database. Click **Match**.

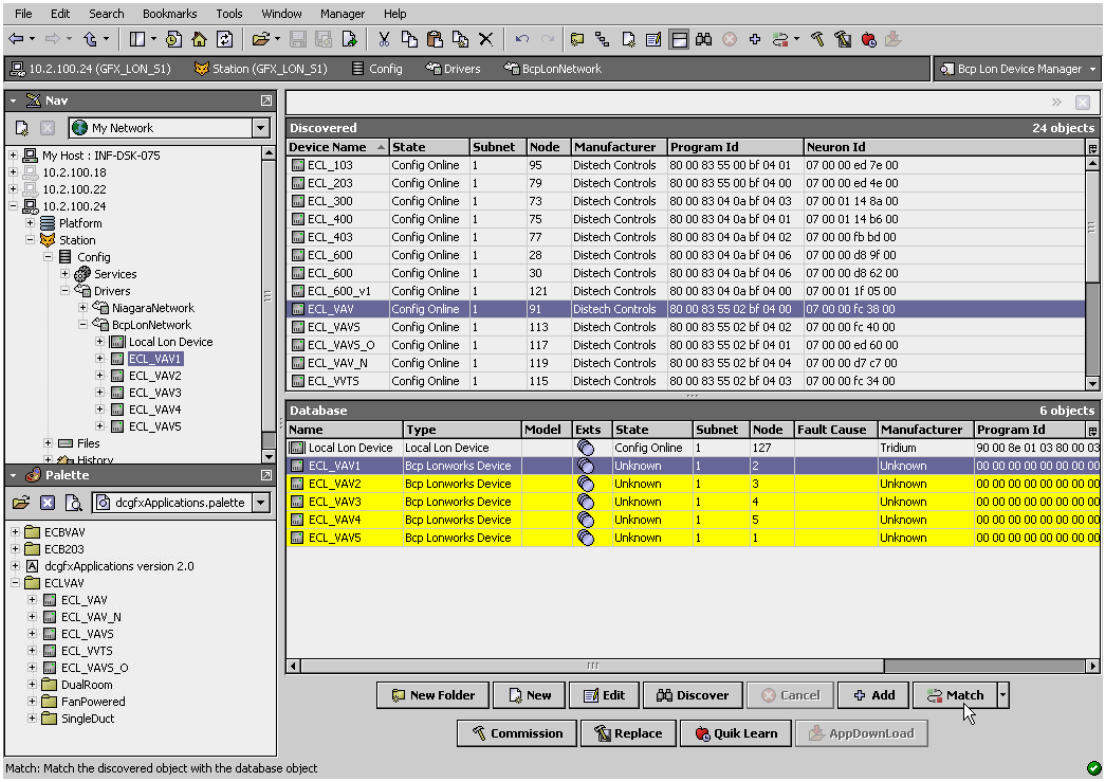


Figure 3-5: Matching Discovered Device with Device in Database

The **Match** window appears.

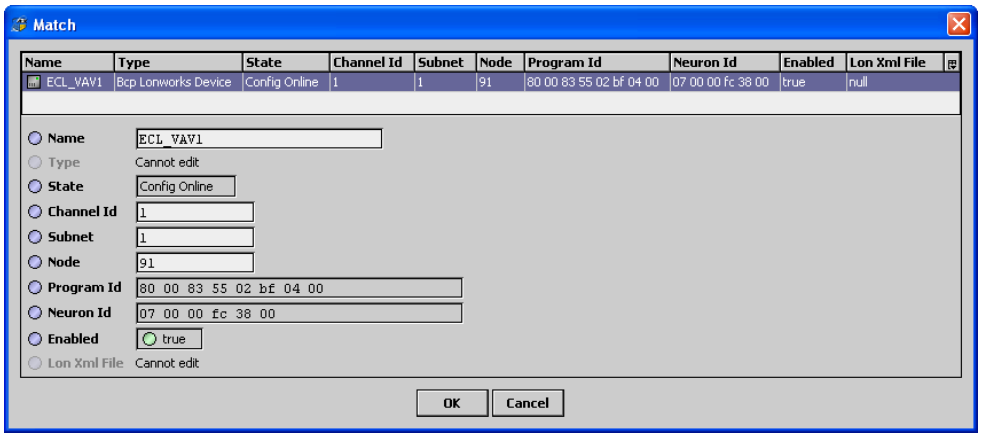


Figure 3-6: Match Window

6. Click **OK**. The devices are now matched and added to the LONWORKS Network database.
7. Once the devices have been added to the LONWORKS Network, commission the devices: To do so, double-click **BcpLonNetwork**, select the device(s), and click **Commission.**

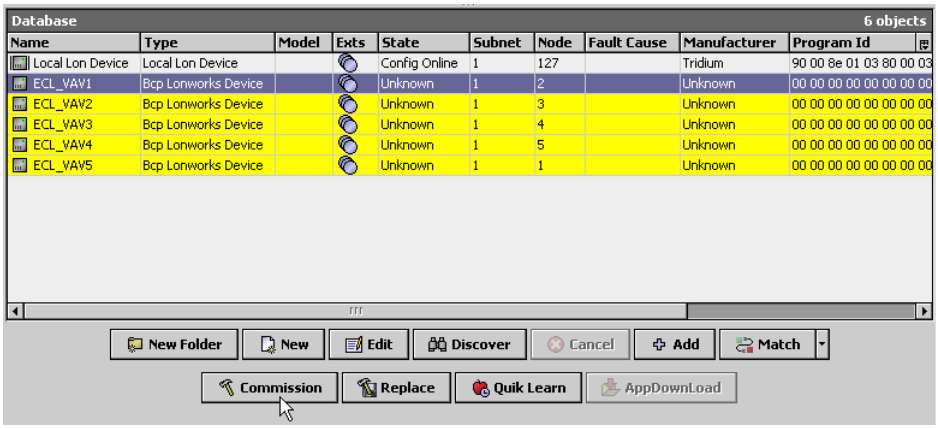


Figure 3-7: Commissioning the Device

8. The **Commission** window is displayed. Click **Service Pin** and then physically press the service pin button on the device. You can also commission the device manually by entering the device's Neuron ID number. For more details on how to commission a device, refer to the "Getting Started" sections in the EC-gfxProgram User Guide.

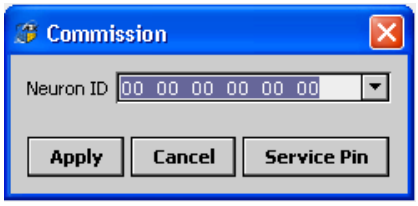


Figure 3-8: Commission Window

9. Now to synchronize the data, the configuration properties must be downloaded from the database to the controller. Right-click on the new device and select **Actions** and then **Download**.

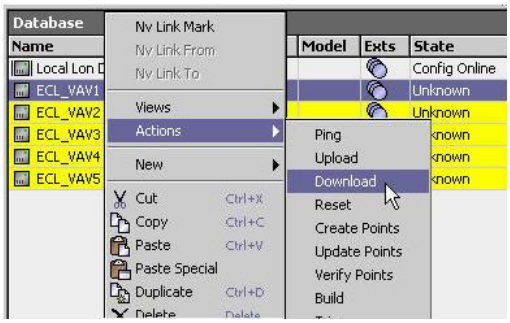


Figure 3-9: Action Download / Action Upload

10. Click **OK** and then perform an upload on the device: Right click on the device and select **Actions** and then **Upload**. This will take the configuration properties from the controller to the database.

11. Now from the BcpLonNetwork folder, double-click the new VAV device. An overview of the VAV system in place appears in the View pane. See *Figure 3-10.*

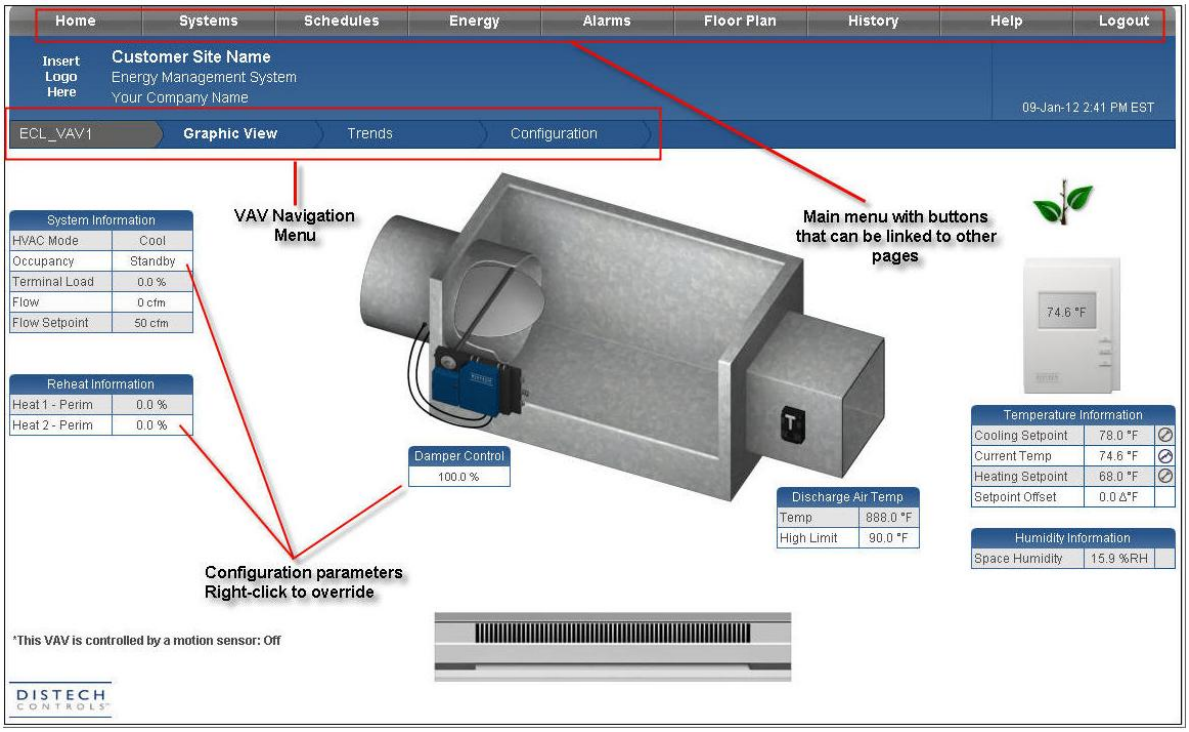


Figure 3-10: ECL-VAV System View with Various Parts Explained

Configuring the VAV

The VAV's space temperature setpoints, system parameters, and heat control configuration can be set from the configuration group of tables in the **Configuration** page. This page can easily be accessed from the VAV navigation menu located at the top of the system view page.

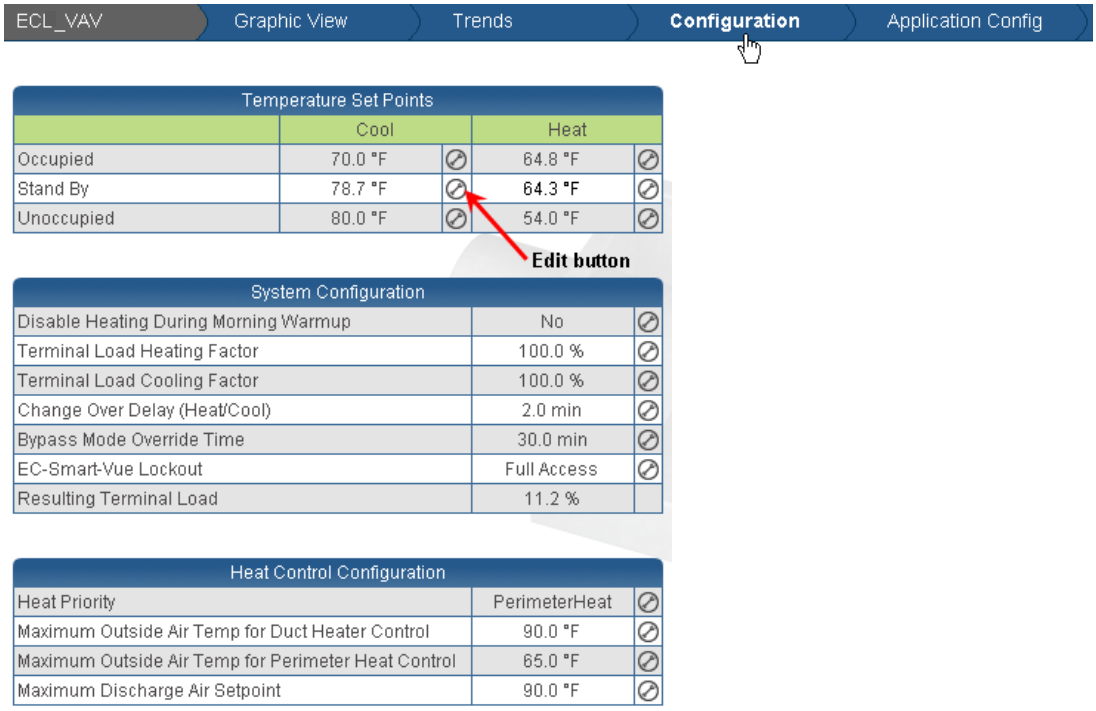


Figure 3-11: Configuration Group of Tables

Configuring the Space Temperature Setpoints

The first table in the **Configuration** page contains the heating and cooling setpoints for the occupied, standby and unoccupied modes. Each setpoint can be easily set using its corresponding Edit button  (see above figure). The table below gives a brief description of each type of setpoint.

Setpoints (heating/cooling)	Description
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.
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.

Configuring the System Parameters

In the **System Configuration** table, general controller parameters are set such as the changeover delay, bypass mode override time, and terminal load scaling factors. In addition, the Allure EC-Smart-Vue sensor's accessibility settings are defined.

The table below describes each of these parameters. Use the Edit buttons to modify these parameters according to the desired system configuration settings

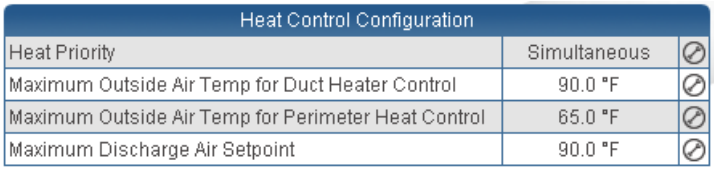
System Configuration		
Disable Heating During Morning Warmup	No	
Terminal Load Heating Factor	100.0 %	
Terminal Load Cooling Factor	100.0 %	
Change Over Delay (Heat/Cool)	2 min	
Bypass Mode Override Time	60 min	
Occupancy Sensor Hold Time	30 min	
EC-Smart-Vue Lockout	Full Access	
Resulting Terminal Load	0.0 %	

Figure 3-12: System Configuration Table

Parameter	Description
Disable Heating During Morning Warmup	Disables perimeter and duct heating during morning warm-up. The morning warm-up mode is used to preheat the building so that when building occupants enter the building in the morning, the temperature is already at or close to the occupied heating setpoint. Morning warm-up assumes that there is warm air in the duct. When there is a demand for heating during morning warm-up, the damper is opened (however, never more than the maximum flow).
Terminal Load Heating Factor	A priority setting parameter for the terminal load factor when the controller is in heating mode. The controller scales the heating requirement of the terminal load based on the terminal load heating factor and then applies the result to the terminal load factor.
Terminal Load Cooling Factor	A priority setting parameter for the terminal load factor when the controller is in cooling mode. The controller scales the cooling requirement of the terminal load based on the terminal load cooling factor and then applies the result to the terminal load factor.
Change Over Delay (Heat/Cool)	Defines the minimum time during which heating must be OFF before cooling can be turned ON as well as the minimum time during which cooling must be OFF before heating turns ON. This parameter prevents the system from continuously oscillating between heating and cooling modes.
Bypass Mode Override Time	The duration of time the controller remains in bypass mode when changed from standby or unoccupied modes.
Occupancy Sensor Hold Time	When a motion sensor is present, the hold time time represents how long the controller remains in occupied mode (after the last room occupancy detected) before returning the controller to standby mode.
EC-Smart-Vue Lockout	Defines how much access a user of the Allure EC-Smart-Vue has to the controller's configuration parameters. The Allure EC-Smart-Vue access ranges from full access to limited access or no access at all. Limited access allows setpoint adjustment only or setpoint adjustment and airflow balancing. Regardless of the access level of the Allure EC-Smart-Vue, the controller's configuration parameters cannot be modified through the Allure EC-Smart-Vue except after a password is entered. To learn how to perform various functions using the Allure EC-Smart-Vue's basic and advanced menus, see *Chapter 4* on page 45.

Setting up Heat Control

The final table in the **Configuration** group of tables allows for the configuration of the heat control settings. The heat priority can be set as well as several maximum limits related to heat control. Each setpoint can be easily set using its corresponding Edit button.



Heat Control Configuration		
Heat Priority	Simultaneous	
Maximum Outside Air Temp for Duct Heater Control	90.0 °F	
Maximum Outside Air Temp for Perimeter Heat Control	65.0 °F	
Maximum Discharge Air Setpoint	90.0 °F	

Figure 3-13: Heat Control Configuration Table

Parameter	Description
Heat Priority	The order in which heating equipment connected to the controller is turned ON. Three options are available: **Duct Heater** – Duct heating is activated first, then perimeter heating (depending on the heating demand). **Perimeter Heat** – Perimeter heating is activated first, then duct heating (depending on the heating demand). **Simultaneous** - Duct and perimeter heating are activated simultaneously.
Maximum Outside Air Temp for Duct Heater Control	Duct heating is disabled when the outdoor temperature exceeds this parameter. This parameter ensures that the HVAC system is not heating the building more than necessary when the outdoor temperature exceeds certain temperatures limits. In general, this feature reduces energy costs by ensuring that the heating is not enabled when it is relatively warm outside.
Maximum Outside Air Temp for Perimeter Heat Control	Perimeter heating is disabled when the outdoor temperature exceeds this parameter. Similar to the “maximum outside temp for duct heater control,” the “maximum outside temp for perimeter heat control” helps reduce energy costs by limiting heat consumption when it is relatively warm outside.
Maximum Discharge Air Setpoint	The maximum discharge air temperature setpoint. In heating mode, the duct heater is limited when the discharge air temperature reaches this maximum setpoint. If the dual maximum option is enabled, the actual airflow setpoint is reset between 55°F and the maximum discharge air setpoint by the heating load. For more on the dual maximum option see page 14.

Balancing the VAV

The VAV airflow balancing can be performed from the Flow Set Points, Calibration Points, and Damper Configuration tables in the **Configuration** page. This page can easily be accessed from the VAV navigation menu located at the top of the system view page.

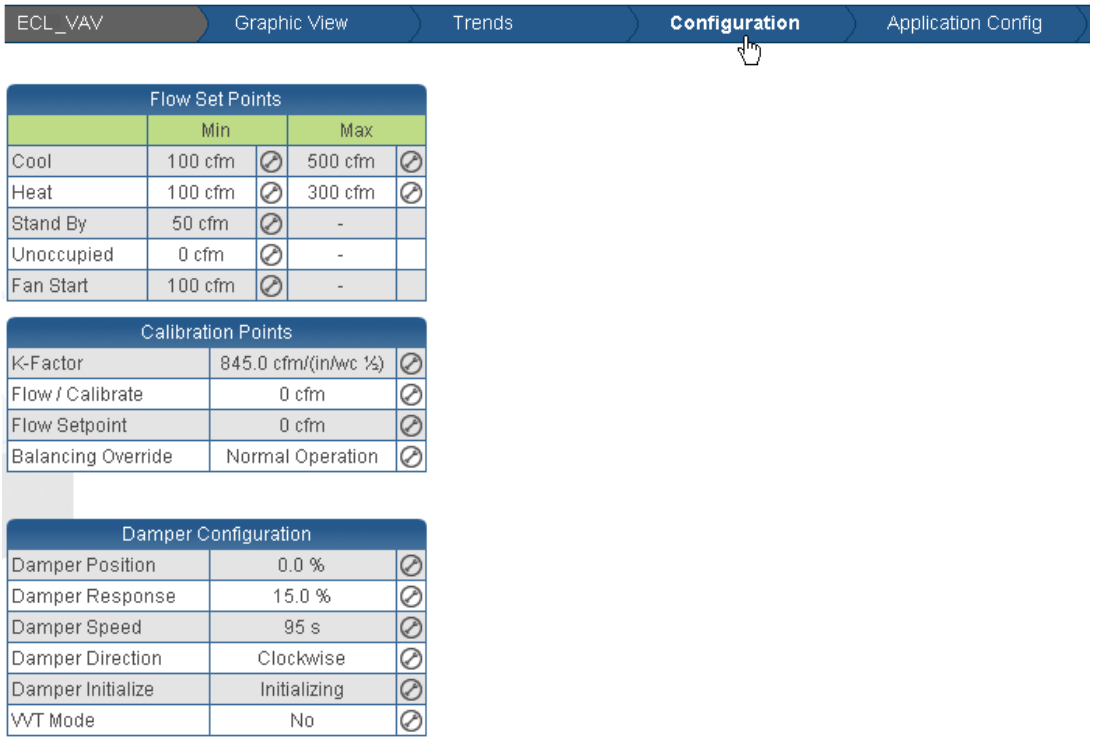


Figure 3-14: Balancing Group of Tables

Configuring the Flow Setpoints

The following table describes the airflow setpoint parameters that can be configured.

Parameter	Description	Parameter	Description
Min Cool Flow Setpoint	Minimum cooling flow setpoint	Max Cool Flow Setpoint	Maximum cooling flow setpoint
Min Heat Flow Setpoint	Minimum flow setpoint when duct heater is active	Max Heat Flow Setpoint	Maximum flow setpoint during heating mode
Min Standby Flow Setpoint	Minimum flow setpoint during standby mode	–	–
Min Unoccupied Flow Setpoint	Minimum flow setpoint during unoccupied mode	–	–
Fan Start[1]	Parallel fan flow setpoint	–	–

1. Applicable to a parallel fan powered VAV

Use the Edit buttons to modify these parameters according to the desired airflow settings.

Performing VAV Airflow Balancing

From the **Calibration Points** table in the **Configuration** view, the VAV airflow balancing procedure can be carried out.

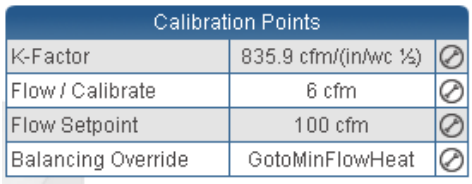


Figure 3-15: Calibration Points Table

Parameter	Description
K-Factor	The actual flow (in cfm) at 1" WC.
Flow / Calibrate	The actual flow in cfm. When the value is sent to the VAV controller, the controller will automatically calibrate its flow reading and readjust the K-Factor.
Flow Setpoint	The actual flow setpoint.
Balancing Override	The balancing override setting. Different values can be selected: normal, minimum flow, minimum flow heat, maximum flow, maximum flow heat, damper full open, damper full close, position, flow percentage, flow value, zero calibration, and damper initialization. When selecting the position, flow percentage, or flow value, an additional parameter is displayed where the actual percentage or flow value can be entered.

Balancing a VAV Controller

1. Enter the VAV box's K-Factor.

The K-Factor can be acquired from the VAV box manufacturer. The table below shows what the K-Factor represents in both Imperial and SI Units.

	Imperial Units	SI Units	
What the K-Factor represents	Airflow (in cfm) at 1" WC	Airflow (L/s) at 1 Pa	Airflow (m3/h) at 1 Pa

2. Override the flow setpoint. To do so, click the Edit button next to the **Flow / Calibrate** parameter and modify it by selecting a relatively high setpoint. You can also modify it using the **Balancing Override** setting to automatically set the flow setpoint to a predefined flow. You can also refer to *Updating the Balancing Override Using the Batch Editor* on page 39.
3. Monitor the current flow until it stabilizes.
4. Using a flow hood, measure the actual airflow. Click the Edit button beside **Flow / Calibrate** and enter this measurement.

   The K-Factor gets adjusted based on the airflow value just entered.
5. Release the flow setpoint override by clicking the Edit button beside **Flow Setpoint**.

At this point, the VAV controller is balanced. The adjusted K-Factor can be included in the balancing report.

Configuring the Damper

The dc *gfx*Applications interface contains several configuration parameters that control the damper's behaviour. For example, the damper response, speed, and direction can be set. In addition, the damper's position can be overridden. The table below describes all the parameters related to the damper configuration.

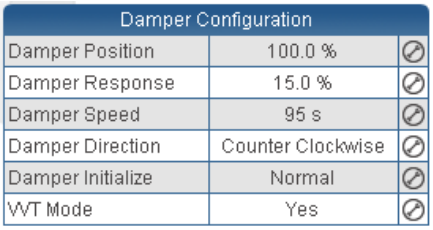


Figure 3-16: Damper Configuration Table

Parameter	Description
Damper Position	The actual position of the damper based on the damper feedback. The damper can open between 0% (fully closed) and 100% (fully open).
Damper Response	A multiplier (in %) applied to the calculated damper movement. It is used to adjust the reaction speed of the damper. The valid damper response range is from 5 to 100%. E.g. Say the VAV determines that the damper should move 25% to achieve the desired flow setpoint. If the damper response is set to 40%, the damper initially moves 10% (25% X 40%). Then, the damper pauses and a new calculation is made to determine how much more it should be moved. This iterative process prevents the damper from overshooting and prevents hunting (oscillations). Minimizing hunting reduces wear on the damper actuator and also minimizes irregular flow.
Damper Speed	Used to specify the time that the damper takes to go from the fully closed position to the fully open position or vice-versa. This parameter can be set between 45 seconds and 95 seconds. However, it is recommended to use the default value of 95 seconds for the built-in actuator. For the built-in actuator in normal control, the lower the damper speed is set, the faster the actuator moves from fully open to fully closed and vice versa. Likewise, the higher the damper speed is set, the slower the actuator moves from fully open to fully closed and vice versa.
Damper Direction	Used to specify the direction (clockwise or counter clockwise) in which the actuator rotates to open the damper.
Damper Initialize	If the mechanical stops on the actuator have been moved to limit the range of movement of the damper, then the damper must be initialized. Setting the Damper Initialize parameter to True resets the damper position and calculates the total number of steps between the stops. To initialize the damper, click the Edit button. The status will change from Normal to Initializing during the initialization process. The actuator mechanical stops should be moved only to limit damper movement from going under 0% or over 100%.
VVT Mode	Used to specify whether VAV or VVT mode is being used. This option can also be used to force a VAV to operate as a VVT.

Use the Edit buttons to modify these parameters according to the desired damper configuration settings.

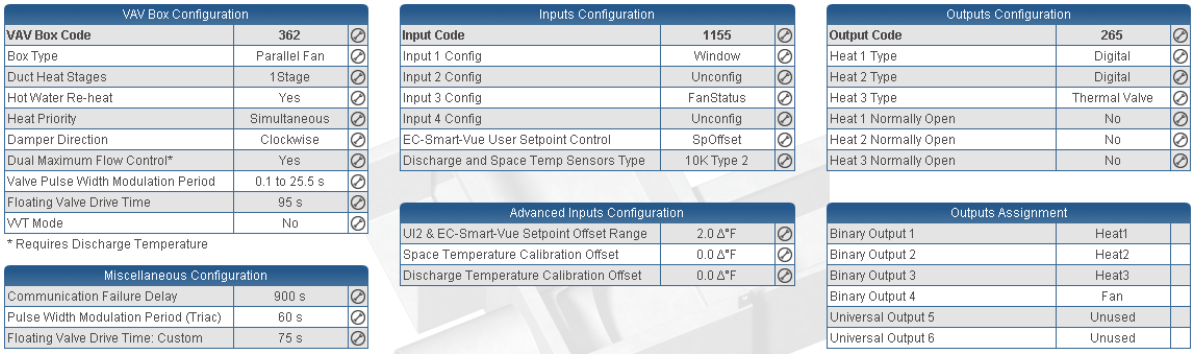
Configuring the Preloaded Applications

The VAV's preloaded applications can easily be configured from within the dc *gfx*Applications interface. All the configuration parameters related to a VAV box setup as well as its input and output settings are accessible from the **Application Config** page and are grouped into several tables.

To select the **Application Config** page:

- In the VAV navigation menu at the top of the system view of the VAV, click **Application Config**.

The **Application Configuration** page appears.



VAV Box Configuration	
VAV Box Code	**362**
Box Type	Parallel Fan
Duct Heat Stages	1Stage
Hot Water Re-heat	Yes
Heat Priority	Simultaneous
Damper Direction	Clockwise
Dual Maximum Flow Control*	Yes
Valve Pulse Width Modulation Period	0.1 to 25.5 s
Floating Valve Drive Time	95 s
VVT Mode	No

* Requires Discharge Temperature

Miscellaneous Configuration	
Communication Failure Delay	900 s
Pulse Width Modulation Period (Triac)	60 s
Floating Valve Drive Time: Custom	75 s

Inputs Configuration	
Input Code	**1155**
Input 1 Config	Window
Input 2 Config	Unconfig
Input 3 Config	FanStatus
Input 4 Config	Unconfig
EC-Smart-Vue User Setpoint Control	SpOffset
Discharge and Space Temp Sensors Type	10K Type 2

Advanced Inputs Configuration	
UI2 & EC-Smart-Vue Setpoint Offset Range	2.0 Δ°F
Space Temperature Calibration Offset	0.0 Δ°F
Discharge Temperature Calibration Offset	0.0 Δ°F

Outputs Configuration	
Output Code	**265**
Heat 1 Type	Digital
Heat 2 Type	Digital
Heat 3 Type	Thermal Valve
Heat 1 Normally Open	No
Heat 2 Normally Open	No
Heat 3 Normally Open	No

Outputs Assignment	
Binary Output 1	Heat1
Binary Output 2	Heat2
Binary Output 3	Heat3
Binary Output 4	Fan
Universal Output 5	Unused
Universal Output 6	Unused

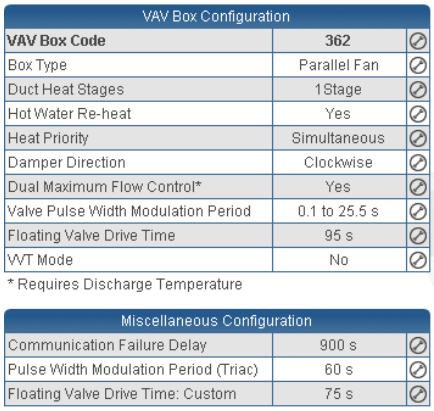
Figure 3-17: Application Config Page

Configuration parameters for the VAV box code, output code, and input code can also be modified using configuration codes, which appear in bold in the **Application Config** page. For a full list of all the configuration codes, including an example of how one is calculated, see *Tables of Configuration Codes* on page 65.

Configuration codes can be updated one controller at a time from the **Application Config** page of the dc *gfx*Applications interface, or in batches using EC-Net^{AX} Pro's Batch Editor. Refer to *Updating the Input Codes Using the Batch Editor* on page 37.

Configuring the VAV Box

The first table in the **Application Configuration** page contains the VAV box configuration setpoints. Each setpoint can be easily set using its corresponding Edit button The table below gives a brief description of each type of configuration parameter.



VAV Box Configuration	
VAV Box Code	**362**
Box Type	Parallel Fan
Duct Heat Stages	1Stage
Hot Water Re-heat	Yes
Heat Priority	Simultaneous
Damper Direction	Clockwise
Dual Maximum Flow Control*	Yes
Valve Pulse Width Modulation Period	0.1 to 25.5 s
Floating Valve Drive Time	95 s
VVT Mode	No

* Requires Discharge Temperature

Miscellaneous Configuration	
Communication Failure Delay	900 s
Pulse Width Modulation Period (Triac)	60 s
Floating Valve Drive Time: Custom	75 s

Figure 3-18: VAV Box Configuration and Miscellaneous Configuration Tables

Parameter	Description
Box Type	The controller's fan powered box type: single duct VAV, parallel fan single duct VAV, or series fan single duct VAV, number of duct heater reheat stages, and VVT operation mode
Duct Heat Stages	The number of duct heater reheat stages: no duct heater reheat (none), duct heater reheat on heat sources 1, 2, and 3 (3 stages), duct heater reheat on heat sources 1, and 2 (2 stages) or duct heater reheat on heat source 1 (1 stage). If no duct heaters or only perimeter heat is required, set this variable to "None". All heat types configured greater than Duct Heat Stages are considered perimeter heaters.
Hot Water Reheat	Duct heater reheat by hot water coil or not.
Heat Priority	The order in which heating equipment connected to the controller is turned ON. Three options are available: **Duct Heater** – Duct heating is activated first, then perimeter heating (depending on the heating demand). **Perimeter Heat** – Perimeter heating is activated first, then duct heating (depending on the heating demand). **Simultaneous** – Duct and perimeter heating are activated simultaneously.
Damper Direction	The direction in which the actuator rotates to open the damper (clockwise or counter clockwise).
Dual Maximum Flow Control	Determine whether the VAV box uses the dual maximum control settings or not. Note that if using the dual maximum option, a discharge temperature sensor is required.
Valve Pulse Width Modulation Period	The pulse width modulation (PWM) valve period can be from 0.1 to 25.5 seconds (25.5) or 0.1 to 5.2 seconds (5.2).
Floating Valve Drive Time	The floating valve drive time which can be set to 25, 30, 50, 60, 95, 125, or 150 seconds or to a custom float time. The custom float time is then manually set in the Floating Valve Drive Time Custom parameter (see *Miscellaneous Configuration* table below).
VVT Mode	Determine whether the VAV box is using flow input or not.

The **Miscellaneous Configuration** table groups three miscellaneous parameters that are also used to configure the VAV's preloaded applications.

Parameter	Description
Communication Failure Delay	Set the delay in seconds in case of communication failure (120 seconds or more is allowed).
Pulse Width Modulation Period (Triac)	Set the triac pulse width modulation period. This is relevant to the heat type output code when it is set to PWM Triac.
Floating Valve Drive Time: Custom	Set a custom floating valve drive time (15 seconds or more).

Configuring the Input Parameters

All input configuration setpoint parameters are found in the **Inputs Configuration** and **Advanced Inputs Configuration** tables. Each setpoint can be easily set using its corresponding Edit button. The table below gives a brief description of each type of input configuration parameter.

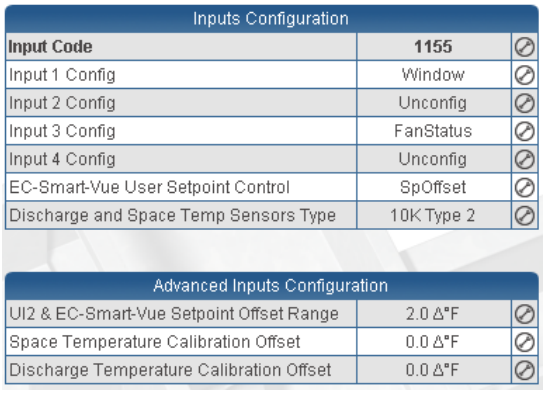


Figure 3-19: Inputs and Advanced Inputs Configuration Tables

Parameter	Description
Input 1 Config	Universal input 1 consists of the following input settings: Unconfig (not configured), SpaceTemp (room temperature sensor), OccDetect (occupancy detection), Window (window contact).
Input 2 Config	Universal input 2 consists of the following input settings: Unconfig (not configured), DischargeTemp (discharge air temperature sensor), SpaceTemp (room temperature sensor), OccDetect (occupancy detection), and Window (window contact).
Input 3 Config	Universal input 3 consists of the following input settings: Unconfig (not configured), DischargeTemp (discharge air temperature sensor), OccDetect (occupancy detection), Window (window contact), and FanStatus (fan powered box status).
Input 4 Config	Universal input 4 consists of the following input settings: Unconfig (not configured), CO2 4-20mA (4-20mA CO2 Sensor (0-2000 ppm)), and CO2 0-5V (0-5V CO2 Sensor (0-2000 ppm)).
EC-Smart-Vue User Setpoint Control	Set the EC-Smart-Vue setpoint control to either SpOffset (room temperature setpoint offset) or Cool Heat SP (cooling and heating dual setpoint).
Discharge and Space Temp Sensors Type	Set the discharge and space temperature sensors to 10K Type 2, 10K Type 3, PT1000, NI1000@0C, or NI1000@22C.

Advanced Inputs Configuration table:

Parameter	Description
UI2 & EC-Smart-Vue Setpoint Offset Range	Set the universal input 2 and EC-Smart-Vue offset setpoint range.
Space Temperature Calibration Offset	Set the space temperature calibration offset (any value between -10.0 and 10.0).
Discharge Temperature Calibration Offset	Set the discharge temperature calibration offset (any value between -10.0 and 10.0).

Configuring the Output Parameters

All output configuration setpoint parameters are found in the **Outputs Configuration** table. Each setpoint can be easily set using its corresponding Edit button 

Outputs Configuration		
Output Code	**265**	
Heat 1 Type	Digital	
Heat 2 Type	Digital	
Heat 3 Type	Thermal Valve	
Heat 1 Normally Open	No	
Heat 2 Normally Open	No	
Heat 3 Normally Open	No	

Figure 3-20: Outputs Configuration Table

The **Outputs Assignment** table allows you to view the actual outputs assigned to the controller. The data in this table will update accordingly whenever an output configuration parameter is modified.

Outputs Assignment		
Binary Output 1	Heat1	
Binary Output 2	Heat2	
Binary Output 3	Heat3	
Binary Output 4	Fan	
Universal Output 5	Unused	
Universal Output 6	Unused	

Figure 3-21: Outputs Assignment Table

The table below gives a brief description of each type of output configuration parameter.

Parameter	Description
Heat 1 Type	To set the type of control signal used to drive heating source 1. The available options are: None, PWM Triac, Digital, PWM valve, Thermal valve, 0-10V, 2-10V, or Floating valve.
Heat 2 Type	To set the type of control signal used to drive heating source 2. The available options are: None, PWM Triac, Digital, PWM valve, Thermal valve, 0-10V, 2-10V, or Floating valve.
Heat 3 Type	To set the type of control signal used to drive heating source 3. The available options are: None, Digital, PWM Triac, PWM Valve, and Thermal valve.
Heat 1 Normally Open	To set the heat 1 type valve to normally open or normally closed.
Heat 2 Normally Open	To set the heat 2 type valve to normally open or normally closed.
Heat 3 Normally Open	To set the heat 3 type valve to normally open or normally closed.

For further information on how to setup the outputs, refer to *Setting Up Outputs* on page 52.

Updating the Input Codes Using the Batch Editor

Configuration codes can be updated one controller at a time from the **Application Config** page of the dc *gfx*Applications interface, or in batches using EC-Net^{AX} Pro's Batch Editor

The following example shows how to update the input codes of several controllers using the Batch Editor:

1. In the Nav tree of EC-Net^{AX} Pro, expand the **Services** folder of the configured station.
2. Double-click **ProgramService**.

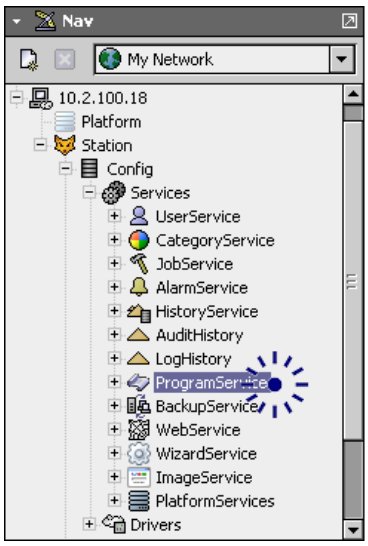


Figure 3-22: Double-Clicking ProgramService

The **Batch Editor** appears in the View pane.

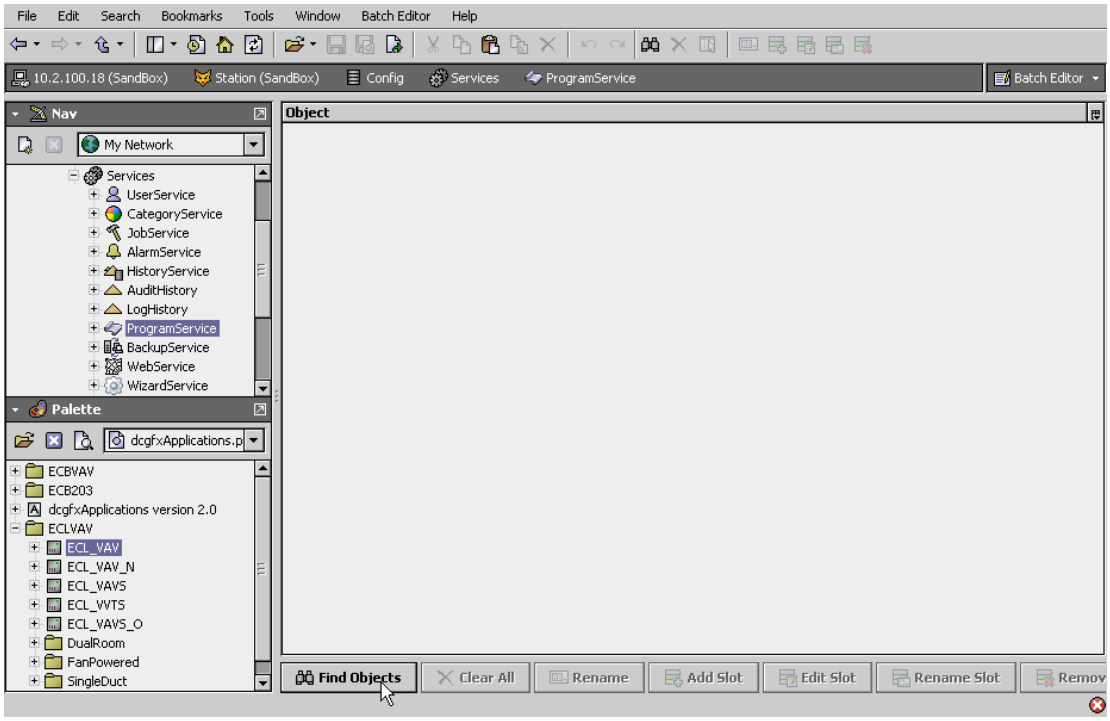


Figure 3-23: Batch Editor

3. Click **Find Objects**. The **Bql Query Builder** appears.

4. In the **Find** area, click the Browse button and navigate to the **BcpLonNetwork** driver.
5. In the **Of type** field, select the **Numeric Point** type.
6. Click the Add button located in the **Match** area. This allows you to filter objects using search criteria.
7. For example, select the following query that will allow you to change the input code: "`displayName - like - nciConfig2_InputCode`". You can also use the asterisk (*) as a wildcard character (e.g. `*InputCode`).

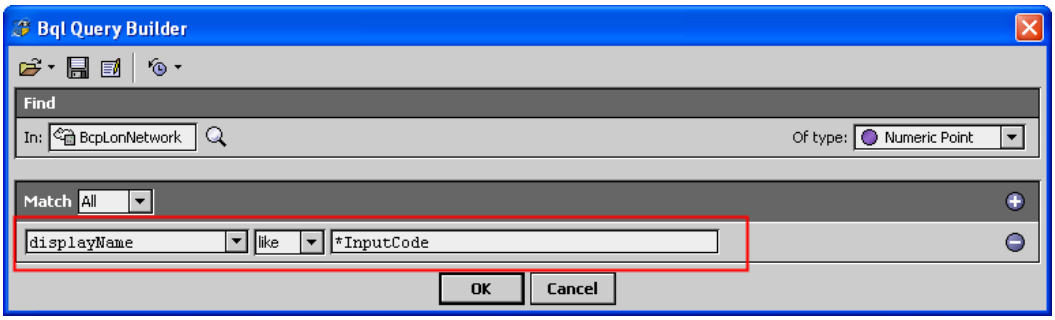


Figure 3-24: Bql Query Builder

8. Click **OK**. All the controllers under the **BcpLonNetwork** driver with an InputCode numeric point are displayed in the View pane.

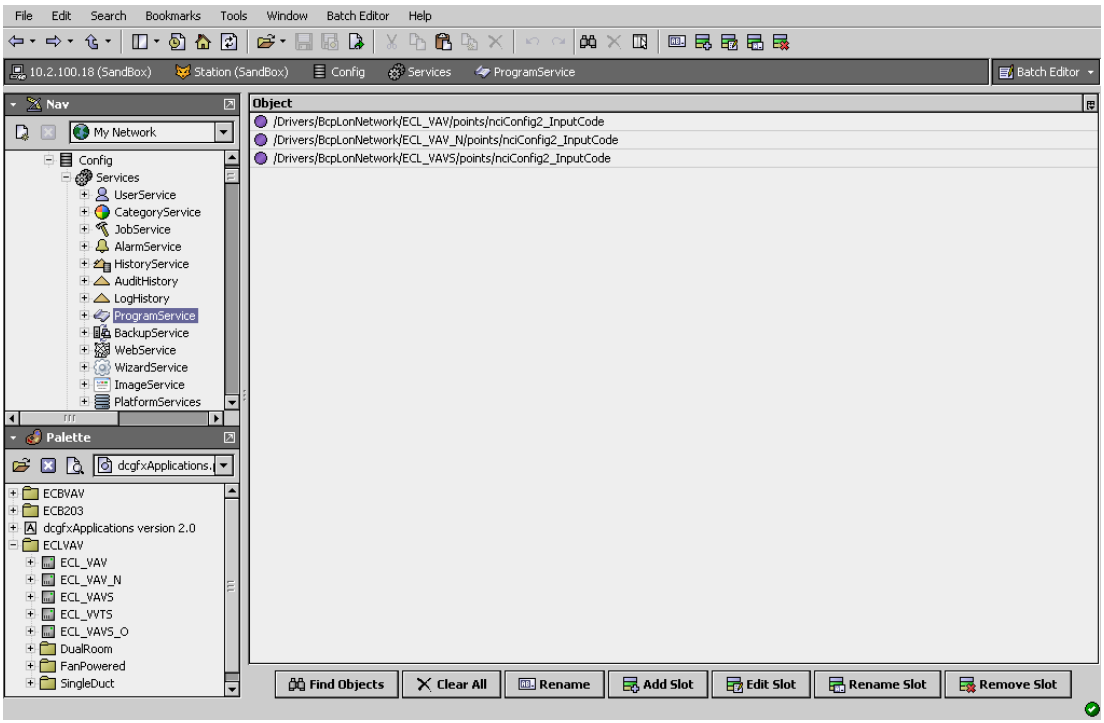


Figure 3-25: Result of the query displaying all matching numeric points

9. Click **Edit Slot**. The **Edit Slot** window appears.
10. In the **Property** field, select the **in16** property.
11. Click the arrows in the **New Value** area to display the new value field and then enter the value you wish to assign to the input code.

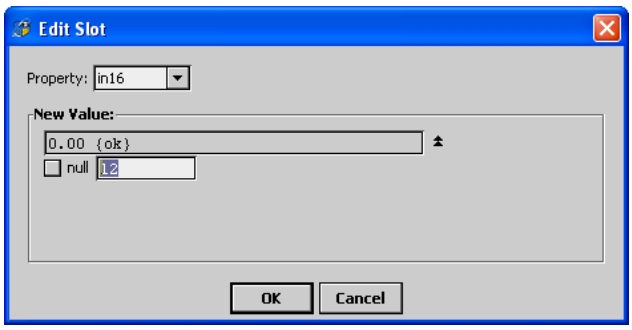


Figure 3-26: Edit Slot

12. Click **OK**. The results are displayed. Click OK to close the dialog box.

    All the numeric points that matched the query are updated with the new value. In other words, the input codes of all the controllers that exist under the **BcpLonNetwork** driver are updated with the new value.

Updating the Balancing Override Using the Batch Editor

The balancing override parameters can also be updated in batches using EC-Net^{AX} Pro's Batch Editor.

1. Double-click **ProgramService.**
2. In the **Batch Editor** window, select **Find Objects**. The **Bql Query Builder** is displayed.
3. Under **Find**, click the browse button and select the **Config** folder.
4. In the **Of Type** field, select the **Enum Point** type.
5. Click the Add button located in the **Match** area. This allows you to filter objects using search criteria.
6. For example, select the following query that will allow you to change the flow command: "`displayName - like - nviFlowCommand_Command`".

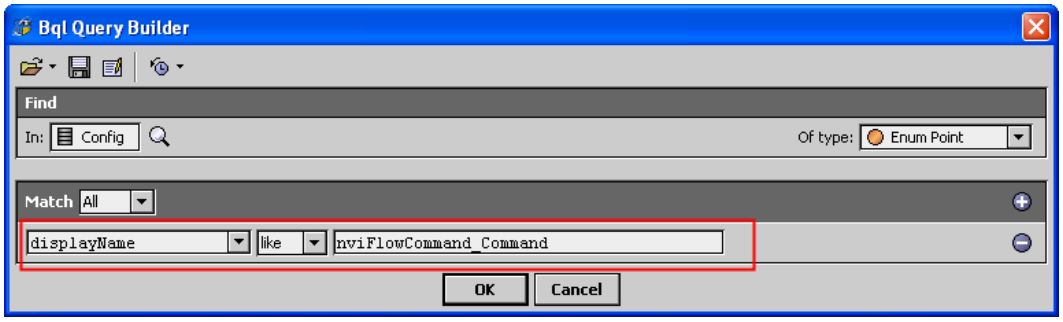


Figure 3-27: Bql Query Builder

7. Click **OK**. All the controllers with a flow command point are displayed in the View pane.

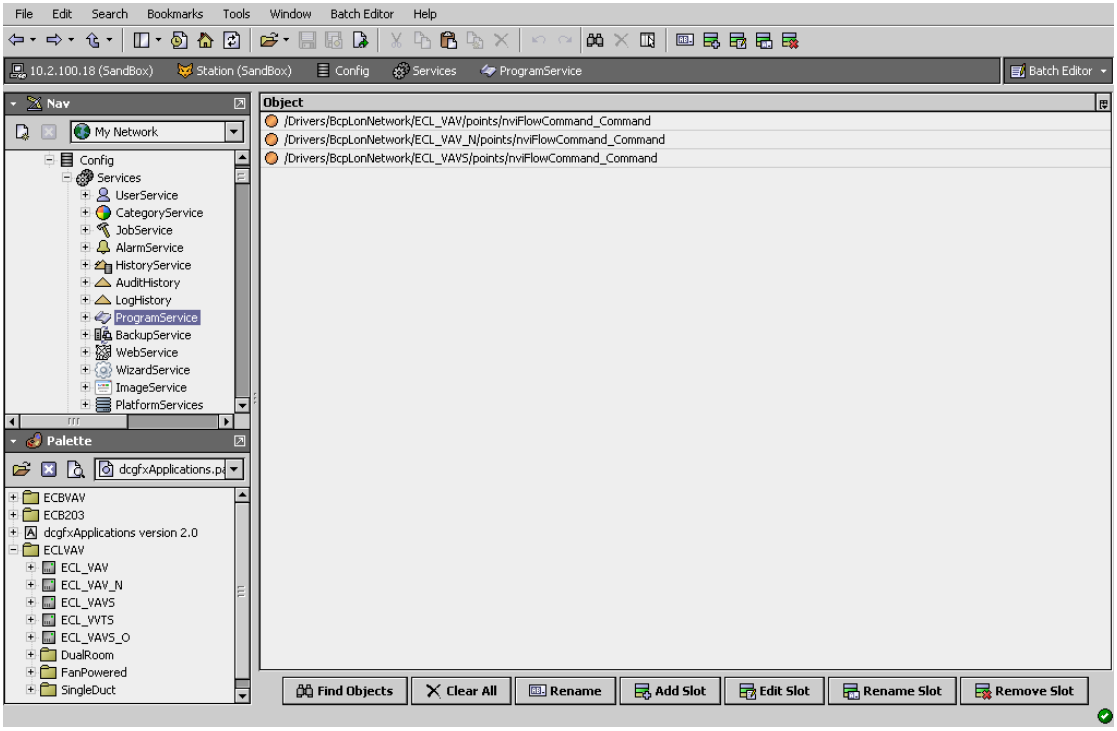


Figure 3-28: Result of the Query Displaying Matching Points

8. Click **Edit Slot**. The **Edit Slot** window appears.
9. In the **Property** field, select the **in16** property.
10. Click the arrows in the **New Value** area to display the new value field and then enter the value you wish to assign to the balancing override.

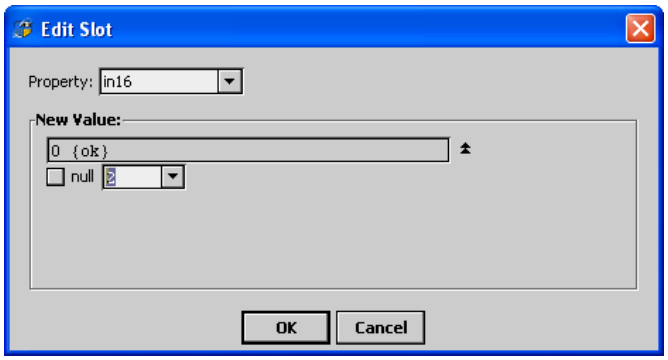


Figure 3-29: Edit Slot

The number entered in the **New Value** field must correspond to the order in which the values are displayed in the **Balancing Override** set list (in the Configuration view). For example, in the **Balancing Override** set list shown in *Figure 3-30*, Normal Operation will be value 0, Goto Min Flow will be value 1, Goto Min Flow Heat will be value 2, and so on. See *Figure 3-30*.

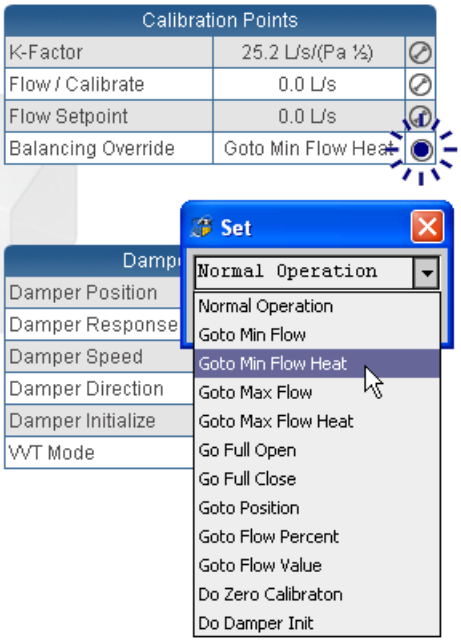
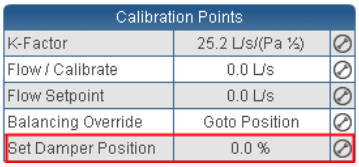
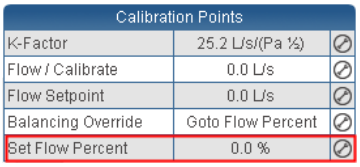
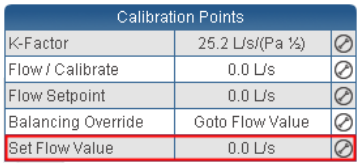


Figure 3-30: Balancing Override Values

If any of these three settings are selected, an additional parameter is displayed in the *Calibration Points Table* where the actual value can be entered:

Goto Position	Goto Flow Percent	Goto Flow Value
		

Keep in mind that the batch editing overrides are permanent; therefore, if you wish to return to the previous setting or any other setting, you must manually reset the setting to the desired value using the batch editor.

Setting up Trends

The dc *gfx*Applications comes with two preconfigured graphs that show two trends: space temperature and effective setpoint. To enable these two trends, refer to the following procedure:

1. In the Nav tree of EC-Net^{AX} Pro, expand the **Services** folder of the configured station.
2. Double-click **HistoryService**.

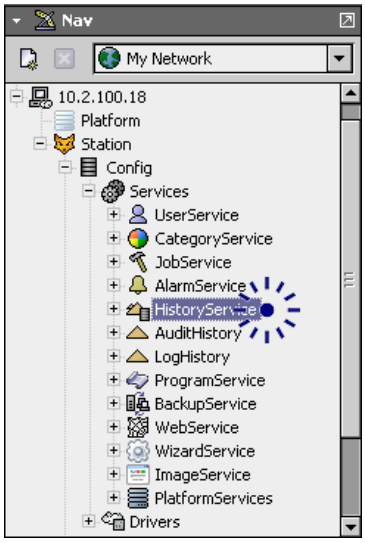


Figure 3-31: Double-clicking HistoryService

The **History Extension Manager** appears in the View pane.

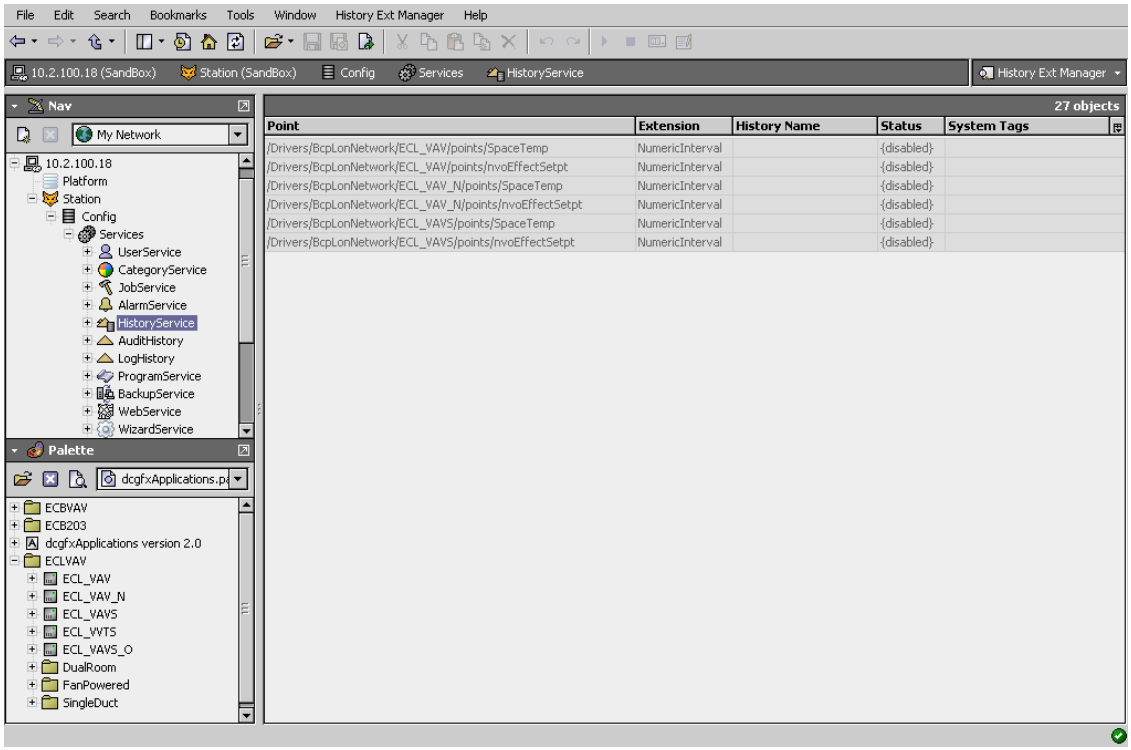


Figure 3-32: History Extension Manager

The History Extension Manager displays the history-related extensions of all the controllers in the **BcpLonNetwork** driver. Of interest are the Numeric Interval extensions of the SpaceTemp and EffectSP points of the VAV controllers, which appear greyed out.

3. Select the Numeric Interval extensions of the SpaceTemp and EffectSetpt points corresponding to the VAV controllers whose trends are to be enabled.
4. Right-click the selected entries. A menu appears.

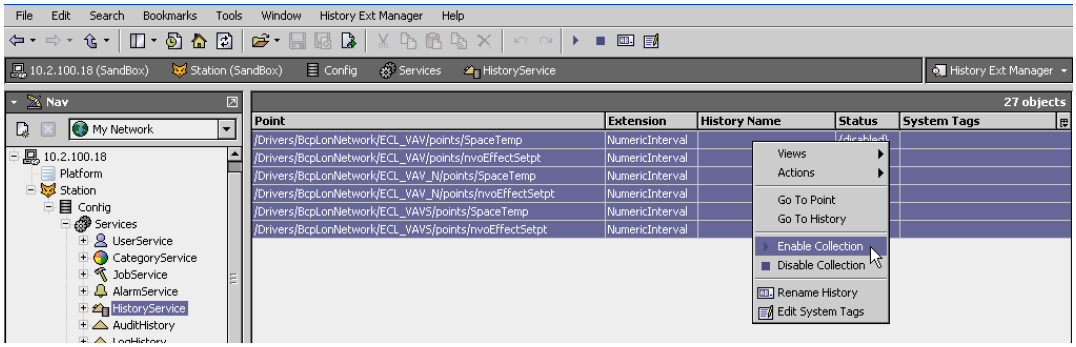


Figure 3-33: Enabling Numeric Interval Extensions

5. Click **Enable Collection**. The selected extensions get enabled and the histories of their corresponding points start getting collected.

Graphs of the collected data can be viewed in the **Trends** page of the dc *gfx*Applications interface. This page can easily be accessed from the VAV navigation menu located at the bottom of the dc *gfx*Applications interface.

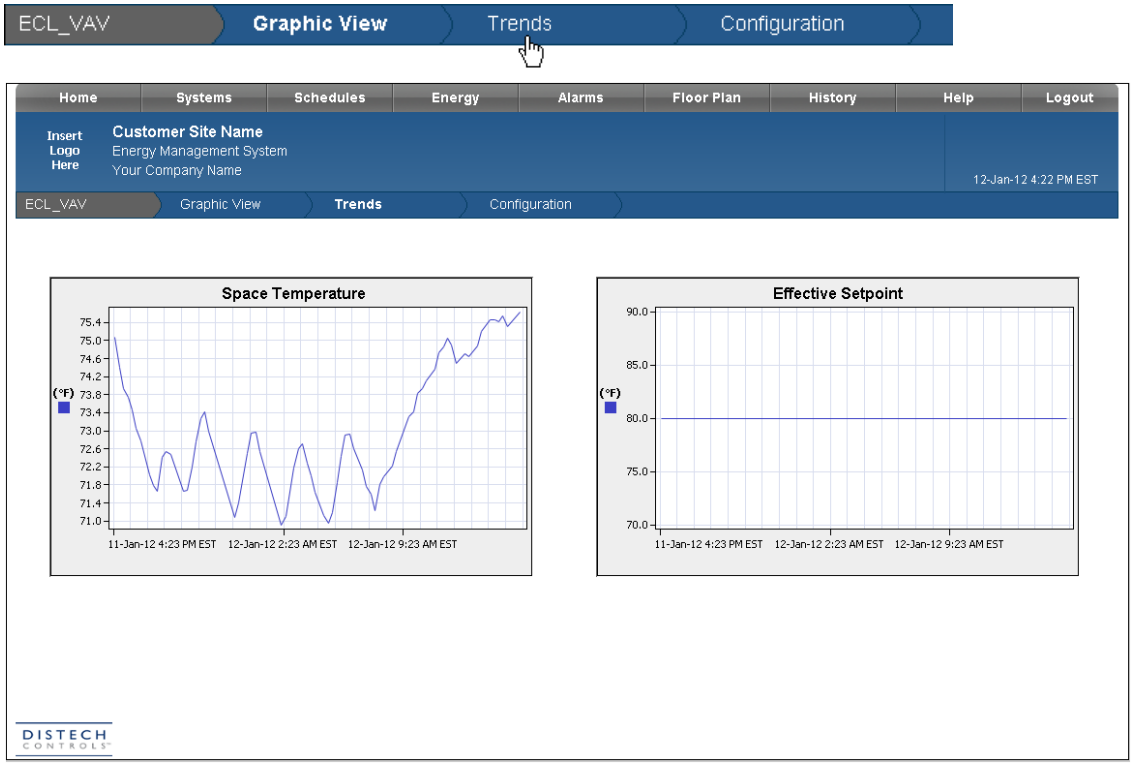


Figure 3-34: Trends Page

CHAPTER 4
ALLURE EC-SMART-VUE SCREEN-BY-SCREEN GUIDE

This chapter provides a detailed screen-by-screen guide on how to perform various functions using the Allure EC-Smart-Vue's basic and advanced menus. These functions include how to set up a controller's network parameters as well as how to configure it with one of its preloaded applications.

In This Chapter

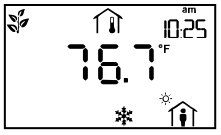
Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Adjusting the Setpoints and Display Units

When a controller is in occupied or bypass mode, the active setpoint can be adjusted using the Allure EC-Smart-Vue's arrow keys. Alternatively, the heating and cooling setpoints can be adjusted from the sensor's User menu. The User menu also allows modifying the display units. The User menu is not password protected.

To enter into the User menu and make changes to the setpoints or display units:

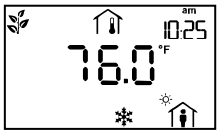
1. Press the **Menu** button once.



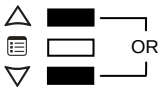
Screen timeout: none

The cooling setpoint starts blinking.

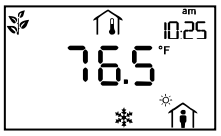
2. Use the arrow keys to increase or decrease the cooling setpoint.



Screen timeout: 3 sec



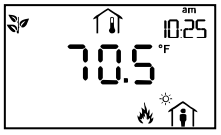
3. Press the **Menu** button to submit the new cooling setpoint.



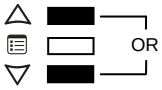
Screen timeout: 3 sec

The heating setpoint starts blinking.

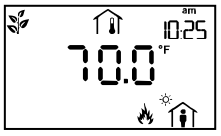
4. Use the arrow keys to increase or decrease the heating setpoint.



Screen timeout: 3 sec



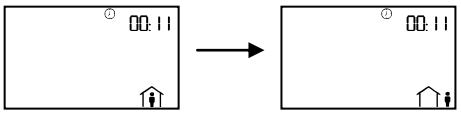
5. Press the **Menu** button to submit the new heating setpoint.



Screen timeout: 3 sec

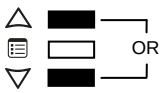
If the controller is in occupied mode, the Units submenu appears. Otherwise, the Bypass submenu appears with the option to manually end the bypass mode. After the Bypass submenu, the Units submenu appears.

To manually end the bypass mode, press on one of the arrow keys to modify the occupancy icon on the screen. Then press the **Menu** button.



6. Use the arrow keys to select the temperature display units.

Screen timeout: 3 sec



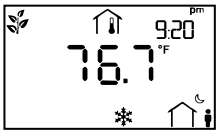
7. Press the **Menu** button to submit the selected display unit.

Screen timeout: 3 sec

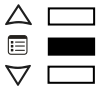
How to put a controller into bypass mode

To change a controller's occupancy mode from standby or unoccupied to bypass mode:

1. Press the **Menu** button once.

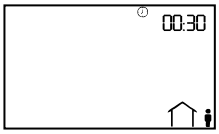


Screen timeout: none

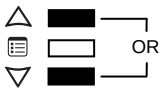


The Bypass submenu appears.

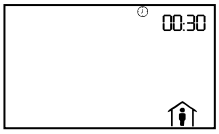
2. Press on one of the arrow keys to modify the occupancy icon on the screen.



Screen timeout: 3 sec



3. Press the **Menu** button.



Screen timeout: 3 sec

The controller goes into bypass mode. When in bypass mode, the Allure EC-Smart-Vue screen displays the current time and also the remaining bypass time.

Advanced Menu	Button Navigation Guide		
			△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Calibrating the Temperature Sensor

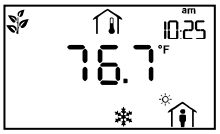
From the Allure EC-Smart-Vue's General Configuration submenu, the Allure EC-Smart-Vue's space temperature sensor can be calibrated and the screen contrast can be adjusted.

This procedure also allows you to calibrate the humidity sensor if your Allure EC-Smart-Vue is equipped with this option.

How to enter the General Configuration submenu

To enter the **General Configuration** submenu:

1. Hold the **Menu** button for five seconds.

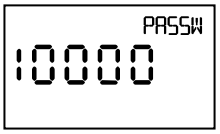


Screen timeout: none

5 sec

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.

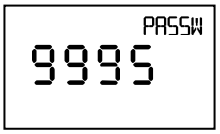


Screen timeout: 15 sec

OR

By default, the password is 9995.

3. Press the **Menu** button to submit the password.



Screen timeout: 15 sec

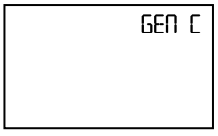
Upon submitting the correct password, the Advanced menu is entered and the Units submenu is displayed.

4. Press the **Menu** button several times until *GEN CFG* appears on the display.

Screen timeout: 15 sec

press several times

5. Press either of the arrow keys to enter the General Configuration submenu.



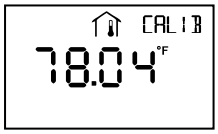
Screen timeout: 30 sec

OR

How to calibrate the temperature sensor and adjust the screen contrast

The General Configuration submenu allows the calibration of the Allure EC-Smart-Vue's space temperature sensor and adjustment of the screen contrast. To perform these two functions:

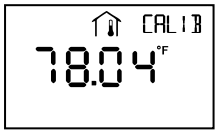
1. Navigate to the Calibration parameter.



Screen timeout: 30 sec

The screen displays the current indoor space temperature.

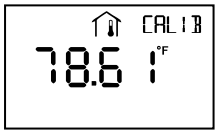
2. Use the arrow keys to modify this reading to make it match that measured by the reference temperature sensor.



Screen timeout: 30 sec

OR

3. Press the **Menu** button to submit the calibrated temperature reading.



Screen timeout: 30 sec

The Contrast parameter appears.

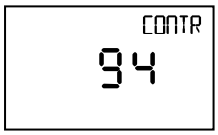
4. Use the arrow keys to adjust the screen contrast.

Screen timeout: 30 sec

OR

The Contrast parameter ranges from 0 to 100, where smaller values give a dimmer contrast than larger ones.

5. Press the **Menu** button to submit the new contrast level. The screen contrast changes according to the new value submitted.

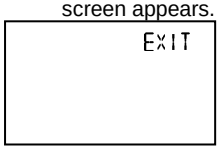


Screen timeout: 30 sec

How to exit the General Configuration submenu

To exit the General Configuration submenu and go up one level, do one of the following:

- Press the **Menu** button several times until the Exit screen appears. Then press either of the arrow keys.



Screen timeout: 30 sec

OR

- Press and hold the **Menu** button for 5 seconds.

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Configuring the VAV

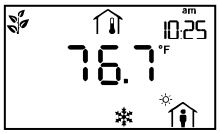
The VAV configuration parameters of an ECL-VAV Series controller can be found in the VAV Configuration submenu of the Advanced menu. Through this submenu, various selections can be made, such as a controller's fan powered box type, number of duct heater reheat stages, and VVT operation mode.

The following instructions explain how to configure a controller's VAV parameters one by one. For instructions on how to configure them all at once using configuration codes, see *Procedure for Submitting New Configuration Codes using an Allure EC-Smart-Vue* on page 64.

How to enter the VAV Configuration submenu and select a controller's VAV parameters

To select a controller's VAV parameters using an Allure EC-Smart-Vue:

1. Hold the **Menu** button for five seconds.

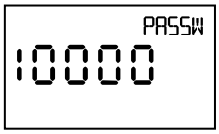


Screen timeout: none

△ ☰ 5 sec ▽

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.

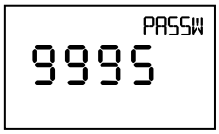


Screen timeout: 15 sec

△ ☰ ▽ OR

By default, the password is 9995.

3. Press the **Menu** button to submit the password.



Screen timeout: 15 sec

△ ☰ ▽

Upon submitting the correct password, the Advanced menu is entered and the Units submenu is displayed.

Screen timeout: 15 sec

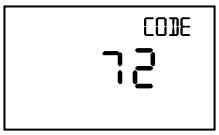
△ ☰ press several times ▽

4. Press the **Menu** button several times until *VAV CFG* appears on the display.

Screen timeout: 30 sec

△ ☰ ▽ OR

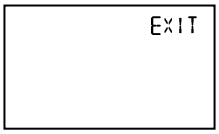
Upon entering the VAV Configuration submenu, the Code parameter appears.



Screen timeout: 30 sec

△ ☰ ▽

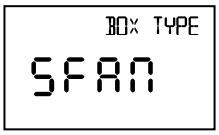
5. To scroll between the different parameters in the VAV Configuration submenu, press the **Menu** button.



Screen timeout: 30 sec

△ ☰ ▽

6. To modify a parameter, use the arrow keys.



Screen timeout: 30 sec

△ ☰ ▽ OR

7. To submit a modified parameter, press the **Menu** button. The next VAV Configuration submenu parameter is displayed.

Screen timeout: 30 sec

△ ☰ ▽

Refer to the table on page 49 for a list of all the *Configuration Parameters for the VAV Series*:

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Configuration Parameters for the VAV Series:

Parameter		Valid Choices		Descriptions	
BOX TYPE[1]	Box Type	0	SdUC	SDUC	Single Duct VAV
		1	SFAn	SFAN	Series Fan Single Duct VAV
		2	PFAn	PFAN	Parallel Fan Single Duct VAV
DUCT HT	Duct Heater Stages	0	nonE	NONE	No Duct Heater Reheat
		1	1 St	1 St	Duct Heater Reheat on Heat Source 1
		2	2 St	2 St	Duct Heater Reheat on Heat Sources 1 & 2
		4	3 St	3 St	Duct Heater Reheat on Heat Sources 1, 2, & 3 (for ECL-VAV only)
HTPRIO	Heat Priority	0	dUCt	DUCT	Duct Heating 1st
		1	PEri	PERI	Perimeter Heating 1st
		2	bOtH	BOTH	Both Heating Simultaneously
DUAL MAX[2]	Dual Maximum Flow Control	0	no	NO	Box is not using Dual Maximum Control Settings
		1	yES	YES	Box is using Dual Maximum Control Settings
HWREHEAT	Hot Water Reheat	0	no	NO	Duct Heater is not Hot Water Coil
		1	yES	YES	Duct Heater Reheat by Hot Water Coil
VVTMODE[3]	VVT Mode	0	no	NO	Box is using Flow Input
		1	yES	YES	Box is not Using Flow Input
FLOATVLVPER	Floating Valve Drive Time		Edit	Edit	
		0	95 S		95 seconds drive time
		1	125 S		125 seconds drive time
		2	150 S		150 seconds drive time
		3	25 S		25 seconds drive time
		4	30 S		30 seconds drive time
		5	50 S		50 seconds drive time
		6	60 S		60 seconds drive time
		7	CUSTOM		Drive time controlled by CustomFloatTime
PWMVLVPER	Pulse Width Modulation Valve Period	0	25.5	25.5	0.1 to 25.5 seconds
		1	5.2	5.2	0.1 to 5.2 seconds

1. Only applicable to ECL-VAV and ECL-VAV-N
2. Does not apply to ECL-VAVS-O model
3. Does not apply to ECL-VVTS model

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Setting Up Inputs

A controller's inputs can be configured through the Input Configuration submenu of the Advanced menu. The table below shows how many universal inputs each controller model has.

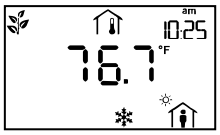
Model	Universal Inputs
ECL-VAVS-O	0
ECL-VAVS	2
ECL-VAV	4
ECL-VVTS	2
ECL-VAV-N	4

The following procedure explains how to configure the inputs one by one. For instructions on how to configure them all at once using configuration codes, see *Procedure for Submitting New Configuration Codes using an Allure EC-Smart-Vue* on page 64.

How to enter the Input Configuration submenu and configure the inputs

To configure the inputs of a controller using an Allure EC-Smart-Vue:

1. Hold the **Menu** button for five seconds.

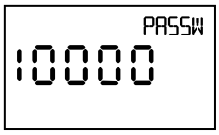


Screen timeout: none

☰ 5 sec

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.

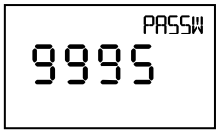


Screen timeout: 15 sec

△ / ☰ / ▽ OR

By default, the password is 9995.

3. Press the **Menu** button to submit the password.



Screen timeout: 15 sec

△ / ☰ / ▽

Upon submitting the correct password, the Advanced menu is entered and the Units submenu is displayed.

Screen timeout: 15 sec

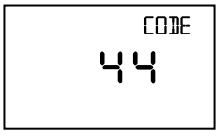
△ / ☰ press several times / ▽

4. Press the **Menu** button several times until *IN CFG* appears on the display.

Screen timeout: 30 sec

△ / ☰ / ▽ OR

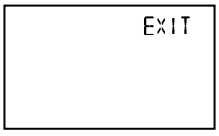
5. Press either of the arrow keys to enter the Input Configuration submenu.
   Upon entering the Input Configuration submenu, the Code parameter appears.



Screen timeout: 30 sec

△ / ☰ / ▽

6. To scroll between the different parameters in the Input Configuration submenu, press the **Menu** button.



Screen timeout: 30 sec

△ / ☰ / ▽

7. To modify a parameter, use the arrow keys.

Screen timeout: 30 sec

△ / ☰ / ▽ OR

8. To submit a modified parameter, press the **Menu** button. The next Input Configuration submenu parameter is displayed.

Screen timeout: 30 sec

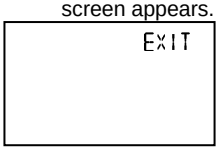
△ / ☰ / ▽

There are between three to five parameters to be configured, depending on the controller model. The *Input Configuration for the VAV Series* table on page 51 shows all the available input types for each controller input.

How to exit the Input Configuration submenu

To exit the Input Configuration submenu and go up one level, do one of the following:

- Press the **Menu** button several times until the Exit screen appears. Then press either of the arrow keys.



Screen timeout: 30 sec

△ / ☰ / ▽ OR

- Press and hold the **Menu** button for 5 seconds.

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Input Configuration for the VAV Series

Input		Input Types		Descriptions	
UI1	Universal Input 1	0	nONE	NONE	Not Configured
		1	SPAC	SPAC	Room Temperature Sensor
		2	OCC	OCC	Occupancy Detection
		3	CONt	CONT	Window Contact
UI2	Universal Input 2	0	nONE	NONE	Not Configured
		1	dI SC	DISC	Discharge Air Temperature Sensor
		2	CONt	CONT	Window Contact
		3	OCC	OCC	Occupancy Detection
		4	SEtP	SETP	Room Temperature Setpoint Offset
UI3[1]	Universal Input 3	0	nONE	NONE	Not Configured
		1	dI SC	DISC	Discharge Air Temperature Sensor
		2	OCC	OCC	Occupancy Detection
		3	CONt	CONT	Window Contact
		4	FAn	FAN	Fan Powered Box Status
UI4[1]	Universal Input 4	0	nONE	NONE	Not Configured
		1	CO24	CO24	4-20mA CO2 Sensor (0-2000 ppm)
		2	CO25	CO25	0-5V CO2 Sensor (0-2000 ppm)
COMSENS SP	EC-Smart-Vue User Setpoint Control	0	dUAL	DUAL	Cooling and Heating Setpoint via EC-Smart-Vue
		1	OFFS	OFFS	Room Temperature Setpoint Offset
SENSORS TYPE	Discharge and Space Temp Sensors Type	0	10-2	10-2	Sensors are 10K Type II
		1	10-3	10-3	Sensors are 10K Type III
		2	1000	1000	Sensors are PT 1000
		3	NI 0C	NI0C	Sensors are NI 1000 @0°C
		4	NI 22	NI22	Sensors are NI 1000 @22°C

1. Only applicable to ECL-VAV and ECL-VAV-N

Advanced Menu	Button Navigation Guide		
			▲ and ▼
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Setting Up Outputs

A controller's outputs can be configured through the Output Configuration submenu of the Advanced menu. The table below shows how many universal outputs and digital outputs each controller has.

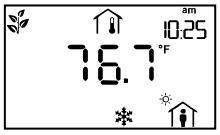
Model	Universal Outputs	Digital Outputs
ECL-VAVS-O	1	2
ECL-VAVS	1	2
ECL-VAV	2	4
ECL-VVTS	1	2
ECL-VAV-N	2	4

The following procedure explains how to configure the outputs one by one. For instructions on how to configure them all at once using configuration codes, see *Procedure for Submitting New Configuration Codes using an Allure EC-Smart-Vue* on page 64.

How to enter the Output Configuration submenu and configure the outputs

To configure the outputs of a controller using an Allure EC-Smart-Vue:

1. Hold the **Menu** button for five seconds.

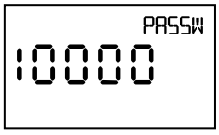


Screen timeout: none

5 sec

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.

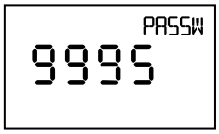


Screen timeout: 15 sec

OR

By default, the password is 9995.

3. Press the **Menu** button to submit the password.



Screen timeout: 15 sec

Upon submitting the correct password, the Advanced menu is entered and the Units submenu is displayed.

Screen timeout: 15 sec

press several times

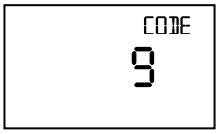
4. Press the **Menu** button several times until *OUT CFG* appears on the display.

5. Press either of the arrow keys to enter the Output Configuration submenu.

Screen timeout: 30 sec

OR

Upon entering the Output Configuration submenu, the Code parameter appears.

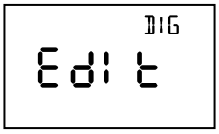


Screen timeout: 30 sec

6. To scroll between the different parameters in the Output Configuration submenu, press the **Menu** button.

Screen timeout: 30 sec

7. To modify a parameter, use the arrow keys.



Screen timeout: 30 sec

OR

8. To submit a modified parameter, press the **Menu** button.

Screen timeout: 30 sec

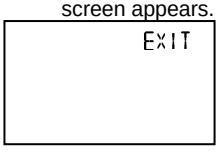
The first two or three parameters of the Output Configuration submenu allow the selection of the types of control signals used to drive the heating sources. The remaining parameters allow configuring the normally open or normally closed option for each heating source.

For details on the available control signal types per heating source and the output wiring guidelines, see the ***Output Wiring*** sections starting on page 53. For a list of the configurable actuator drive times of an ECL-VAV-N, see *Configurable Actuator Damper Drive Times* on page 56.

How to exit the Output Configuration submenu

To exit the Output Configuration submenu and go up one level, do one of the following:

- Press the **Menu** button several times until the Exit screen appears. Then press either of the arrow keys.



Screen timeout: 30 sec

OR

- Press and hold the **Menu** button for 5 seconds.

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Output Wiring (ECL-VAV)

Heat 1 Configuration

Heat1 Type	
None	No Reheat
Pwm Triac	Modulating PWM on DO1 & AO5
Digital	Digital Reheat on DO1
Pwm Valve	PWM Valve on DO1
Thermal Valve	Thermal Valve on DO1
0-10V	Modulating 0-10V on AO5
2-10V	Modulating 2-10V on AO5
Floating Valve	Floating Valve on DO1 and DO2

Heat 2 Configuration (Depends on Heat 1 Configuration)

<table>
<tr><th>Heat2 Type</th><th colspan="4">Heat1 Type</th></tr>
<tr><th></th><th>Heat 1 not configured</th><th>Heat1 not floating</th><th>Heat1 floating</th><th>Heat 1 Floating and Fan Powered Box</th></tr>
<tr><td>None</td><td colspan="4">n/a</td></tr>
<tr><td>Pwm Triac</td><td rowspan="6">Cannot configure</td><td>DO2 & AO6</td><td colspan="2">DO3 & AO6</td></tr>
<tr><td>Digital</td><td rowspan="2">DO2</td><td colspan="2" rowspan="2">DO3</td></tr>
<tr><td>Pwm Valve</td></tr>
<tr><td>Thermal Valve</td><td colspan="3" rowspan="2">AO6</td></tr>
<tr><td>0-10V</td></tr>
<tr><td>2-10V</td><td rowspan="2">Floating Valve</td><td>DO2 - Open</td><td>DO3 - Open</td><td>n/a</td></tr>
<tr><td></td><td>DO3 - Close</td><td>DO4 - Close</td><td>n/a</td></tr>
</table>

Heat 3 Configuration (Depends on Heat 1 and Heat 2 Configuration)

Heat3Type	Heat 1 and Heat2 Type			
	Heat 1 and Heat 2 not configured	Heat 1 and Heat 2 not floating	Heat 1 or Heat 2 floating	Heat 1 and Heat 2 floating OR Heat 1 or Heat 2 floating and Fan Powered Box
None	n/a			
Digital	Cannot configure	DO3	DO4	n/a
Pwm Triac				
Pwm Valve				
Thermal Valve				

Example:

Suppose Heat 1 Type is a floating valve, and both Heat 2 and Heat 3 Types are PWM Triac. In this case, Digital Outputs 1 and 2 of the controller are used to control heat source 1, Digital output 3 or Analog Output 6 can be used to control heat source 2, and Digital output 4 is used to control heat source 3.

In general, a heat type uses the next available digital output in sequence. For example, Heat 3 Type uses DO3 unless Heat 1 Type or Heat 2 Type is a floating valve, in which case DO4 is used instead of DO3.

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Output Wiring (ECL-VAVS-O, ECL-VAVS, and ECL-VVTS)

Heat 1 Configuration

Heat1Type	
None	No Reheat
Pwm Triac[1]	Modulating PWM on DO1 & AO3
Digital	Digital Reheat on DO1
Pwm Valve	PWM Valve on DO1
Thermal Valve	Thermal Valve on DO1
0-10V	Modulating 0-10V on AO3
2-10V	Modulating 2-10V on AO3
Floating Valve	Floating Valve on DO1 and DO2

1. Outputs only on DO1 if Heat2 is 0-10V or 2-10V

Heat 2 Configuration (Depends on Heat 1 Configuration)

Heat2Type	Heat1 Type			
	Heat 1 not configured	**Heat1 not floating**	**Heat1 analog**	**Heat1 floating**
None	n/a			
Digital	Cannot configure	DO2		n/a
Pwm Triac				
Pwm Valve				
Thermal Valve				
0-10V		AO3	n/a	AO3
2-10V				

Example:

Suppose Heat 1 Type is an analog 0-10V signal and Heat 2 Type is PWM Triac. In this case, Analog output 3 of the controller is used to control heat source 1 and Digital output 2 of the controller is used to control heat source 2.

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Output Wiring (ECL-VAV-N)

Heat 1 Configuration

Heat1Type	
None	No Reheat
Pwm Triac	Modulating PWM on DO1 and AO5
Digital	Digital Reheat on DO1
Pwm Valve	PWM Valve on DO1
Thermal Valve	Thermal Valve on DO1
0-10V	Modulating 0-10V on AO5
2-10V	Modulating 2-10V on AO5
Floating Valve	Floating Valve on DO1 and DO2

Heat 2 Configuration

Use this configuration when BoxType is single duct.

Heat2Type	Heat1 and External Damper Type				
	None	Heat1 not floating		Heat1 floating	
		External Damper floating	External Damper analog	External Damper floating	External Damper analog
None	n/a	n/a	n/a	n/a	n/a
Pwm Triac	Cannot configure	DO2 & AO6	DO2	n/a	DO3
Digital		DO2			
Pwm Valve					
Thermal Valve					
Analog 0-10V		AO6	n/a	AO6	n/a
Analog 2-10V					

Use this configuration when BoxType is either Series Fan or Parallel Fan.

Heat2Type	Heat1 and External Damper Type			
	None	Heat1 not floating	Heat1 floating	
			External Damper floating	External Damper analog
None	n/a			
Pwm Triac	Cannot configure	DO2	n/a	DO3
Digital				
Pwm Valve				
Thermal Valve				
Analog 0-10V		n/a		n/a
Analog 2-10V				

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Fan Command Configuration

	External Damper Type	
Fan (BoxType)	Floating	Analog
Single Duct	n/a	n/a
Series Fan	AO6	DO4
Parallel Fan		

External Damper Configuration

ExtDamperType	
Floating	External Actuator Floating Type on DO3 and DO4
0-10V	External Actuator 0-10V on AO6
2-10V	External Actuator 2-10V on AO6
10-0V	External Actuator 10-0V on AO6
10-2V	External Actuator 10-2V on AO6

Example:

Suppose External Damper Type and Heat 1 Type are floating valves, Heat 2 Type is an analog 0-10V signal and box type is a single duct. In this case, Digital Outputs 1 and 2 of the controller are used to control heat source 1, Digital Outputs 3 and 4 are used to control the damper, and Analog output 6 is used to control heat source 2.

Configurable Actuator Damper Drive Times

Valid Choices	
Custom	Custom Damper Drive Time
45 S	45 sec drive time
60 S	60 sec drive time
90 S	90 sec drive time
95 S	95 sec drive time
108 S	108 sec drive time
125 S	125 sec drive time
150 S	150 sec drive time

Advanced Menu	Button Navigation Guide		
			△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

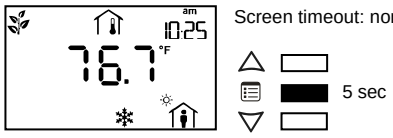
Configuring the Flow Setpoint Parameters

The flow setpoint parameters of the controller can be set in the Flow Setpoint submenu, which is part of the Advanced Menu of the Allure EC-Smart-Vue.

How to enter the Flow Setpoint submenu and configure a parameter

The Flow Setpoint submenu has several configurable parameters. To enter this submenu and configure a parameter:

1. Hold the **Menu** button for five seconds.

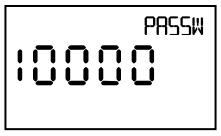


Screen timeout: none

5 sec

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.

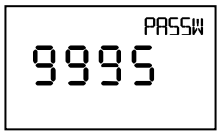


Screen timeout: 15 sec

OR

By default, the password is 9995.

3. Press the **Menu** button to submit the password.



Screen timeout: 15 sec

Upon submitting the correct password, the Advanced menu is entered and the Units submenu is displayed.

4. Use the arrow keys to select the display units of the flow setpoint parameters.

Screen timeout: 15 sec

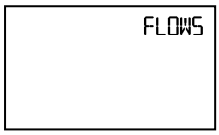
OR

5. Press the **Menu** button to submit the display units type.

Screen timeout: 15 sec

The *FLOWSP* menu then appears on the display.

6. Press either of the arrow keys to enter the Flow Setpoint submenu.



Screen timeout: 30 sec

OR

The minimum flow (MIN) parameter appears.

Screen timeout: 60 sec

7. To scroll between the different parameters in the Flow Setpoint submenu, press the **Menu** button.
8. To modify a parameter, use the arrow keys. To enter a new parameter value, press the **Menu** button.

The table below shows all the parameters under the Flow Setpoint submenu.

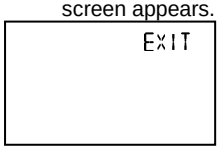
Name on Screen	Full Name	Screen Timeout
MIN	Minimum flow	60 sec
MAX	Maximum flow	60 sec
MINHT	Minimum flow in Heating mode	60 sec
MAXHT	Maximum flow in Heating mode	60 sec
STBY	Minimum flow in Standby mode	60 sec
UNOCC	Minimum flow in Unoccupied mode	60 sec
PFANFLOWSP[1]	Parallel fan flow setpoint	60 sec

1. Applicable to a parallel fan powered VAV

How to exit the Flow Setpoint submenu

To exit the Flow Setpoint submenu and go up one level, do one of the following:

- Press the **Menu** button several times until the Exit screen appears. Then press either of the arrow keys.



Screen timeout: 30 sec

OR

- Press and hold the **Menu** button for 5 seconds.

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

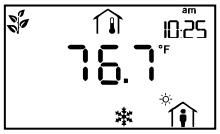
Performing VAV Airflow Balancing

The airflow balancing procedure can be carried out from the Balancing submenu, which is part of the Advanced Menu of the Allure EC-Smart-Vue.

How to enter the Balancing submenu

To enter the Balancing submenu:

1. Hold the **Menu** button for five seconds.

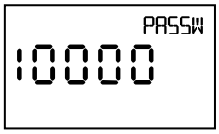


Screen timeout: none

△ ☰ ▽ 5 sec

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.

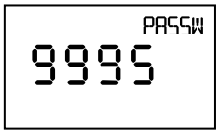


Screen timeout: 15 sec

△ ☰ ▽ OR

By default, the password is 9995.

3. Press the **Menu** button to submit the password.



Screen timeout: 15 sec

△ ☰ ▽

Upon submitting the correct password, the Advanced menu is entered and the Units submenu is displayed.

4. Use the arrow keys to select which display units are to be used in the Balancing submenu.

Screen timeout: 15 sec

△ ☰ ▽ OR

5. Press the **Menu** button to submit the selected display units type.

Screen timeout: 15 sec

△ ☰ ▽

6. Press the **Menu** button several times until the Balancing (*BAL*) menu appears on the display.

Screen timeout: 15 sec

△ ☰ ▽

7. Press either of the arrow keys to enter the Balancing submenu.
   Upon entering the Balancing submenu, the K-Factor parameter appears.

Screen timeout: 5 min

△ ☰ ▽

How to perform airflow balancing

The K-Factor can be acquired from the VAV box manufacturer. The table below shows what the K-Factor represents in both Imperial and SI Units.

	Imperial Units	SI Units	
What the K-Factor is	Airflow (in cfm) at 1" WC	Airflow (L/s) at 1 Pa	Airflow (m3/h) at 1 Pa

To perform the airflow balancing procedure:

1. Use the arrow keys to enter the K-Factor.

Screen timeout: 5 min

△ ☰ ▽ OR

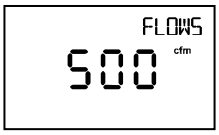
2. Press the **Menu** button to submit the K-Factor.

Screen timeout: 5 min

△ ☰ ▽

The Flow Setpoint parameter appears.

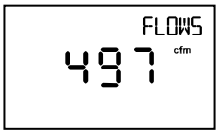
3. Use the arrow keys to override the flow setpoint. Choose a relatively high setpoint.



Screen timeout: 5 min

△ ☰ ▽ OR

4. Press the **Menu** button to submit the new flow setpoint.

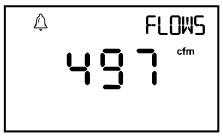


Screen timeout: 5 min

△ ☰ ▽

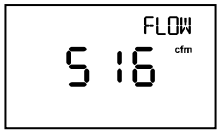
When the flow setpoint is modified, the icon 🔔 appears, indicating that this parameter has been overridden. For information on removing overrides, see *How to release overrides*.

Advanced Menu	Button Navigation Guide		
			▲ and ▼
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu



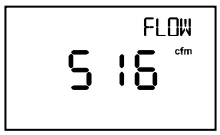
The Flow parameter appears. This parameter represents the airflow as measured by the controller.

5. Monitor the Flow parameter until it stabilizes.

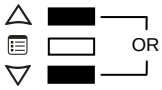


Screen timeout: 5 min

6. Using a flow hood, measure the actual airflow. Use the arrow keys to enter this measurement into the Flow parameter.



Screen timeout: 5 min



7. Press the **Menu** button to submit the actual airflow.

Screen timeout: 5 min

The Damper parameter appears. Note that at this point, the K-Factor gets adjusted based on the airflow value just entered.

8. Press the **Menu** button several times until the K-Factor parameter reappears. This value can be included in the balancing report.

Screen timeout: 5 min

The VAV controller is now balanced.

How to perform balancing override

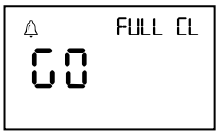
The balancing override setting can be selected from the **Go** submenu. Different values can be selected: normal, minimum flow, minimum flow heat, maximum flow, maximum flow heat, full open (damper), and full close (damper). This procedure can also be used to override the flow setpoint as shown in step 3 in "*How to perform airflow balancing*".

1. Press the **Menu** button several times until the **GO** menu appears on the display.

Screen timeout: 5 min

2. Press the **Menu** button several times until the **GO** menu appears on the display.
3. Use the arrow keys to scroll through the **Go** menu options.
4. To select the desired option, press the **Menu** button to submit the new value.

When the balancing override position is modified, the bell icon appears, indicating that this parameter has been overridden. For information on removing overrides, see *How to release overrides*.



How to initialize the damper

If the mechanical stops on the actuator have been moved to limit the range of movement of the damper, then the damper must be initialized. Damper initialization resets the damper position and calculates the total number of steps between the stops.

The actuator mechanical stops should be moved only to limit damper movement from going under 0% or over 100%.

To initialize the damper using the Allure EC-Smart-Vue:

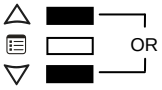
1. Navigate to the Initialize Damper parameter.

Screen timeout: 5 min

The screen displays the current damper position.

2. Press one of the arrow keys to change the displayed value to 1.

Screen timeout: 5 min

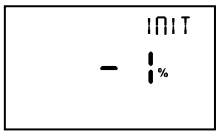


3. Press the **Menu** button.

Screen timeout: 5 min

The damper begins the initialization process. During this process, the screen displays *-1*.

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu



Screen timeout: 5 min

After a few minutes, the screen redisplays the damper's current position.

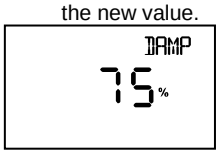
Screen timeout: 5 min

The damper is now initialized.

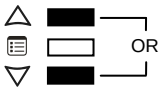
Other functions in the Balancing menu

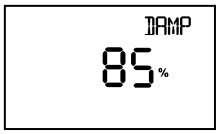
The Balancing submenu contains three other parameters that complement those mentioned above.

- To override the damper position, navigate to the Damper parameter and then use the arrow keys to change the displayed value. Then press the **Menu** button to submit the new value.



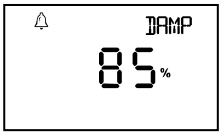
Screen timeout: 5 min



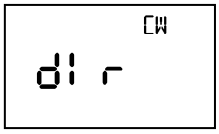


Screen timeout: 5 min

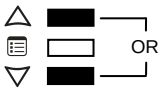
When the damper position is modified, the icon 🔔 appears, indicating that this parameter has been overridden. For information on removing overrides, see *How to release overrides*.

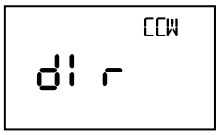


- To change the direction in which the actuator rotates to open the damper, navigate to the Direction parameter (*dIr*) and then use the arrow keys to change the rotation direction from clockwise to counter clockwise or vice versa. Then press the **Menu** button to submit the new rotation direction.



Screen timeout: 5 min





Screen timeout: 5 min

- To view the current differential pressure reading, navigate to the Pressure parameter.

Screen timeout: 5 min

How to release overrides

The presence of the icon 🔔 in the display screens of the Flow Setpoint or Damper parameters indicates that either of them is overridden. An override normally times out after two hours. However, it should be released manually when airflow balancing is complete. Also note that both the Flow Setpoint and Damper parameters cannot be overridden at the same time, so overriding one parameter automatically releases the other.

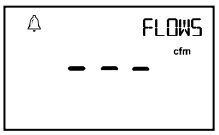
To manually release an override:

1. Press and hold both arrow keys simultaneously.

Screen timeout: 5 min

The screen displays three dashes.

2. Press the **Menu** button.

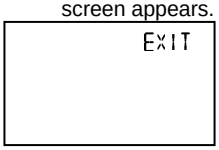


Screen timeout: 5 min.

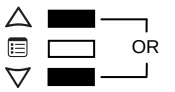
How to exit the Balancing submenu

To exit the Balancing submenu and go up one level, do one of the following:

- Press the **Menu** button several times until the Exit screen appears. Then press either of the arrow keys.



Screen timeout: 30 sec



- Press and hold the **Menu** button for 5 seconds.

Advanced Menu	Button Navigation Guide		
	☰		△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Performing Overrides

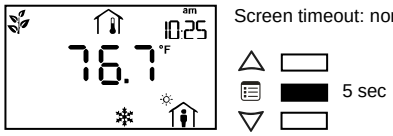
The Overrides submenu of the Allure EC-Smart-Vue's Advanced menu allows performing damper overrides as well as output overrides.

Output overrides range from 0 – 100% in increments of 1%. For digital outputs, any value different from 0 represents On.

How to perform an override

To perform a damper or output override:

1. Hold the **Menu** button for five seconds.

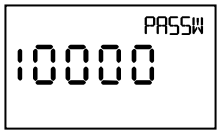


Screen timeout: none

5 sec

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.

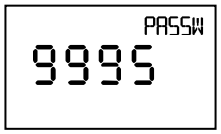


Screen timeout: 15 sec

OR

By default, the password is 9995.

3. Press the **Menu** button to submit the password.



Screen timeout: 15 sec

4. Upon submitting the correct password, the Advanced menu is entered and the Units submenu is displayed.

Screen timeout: 15 sec

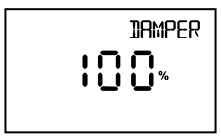
X4

5. Press the **Menu** button several times until *OVR* appears on the display.

Screen timeout: 30 sec

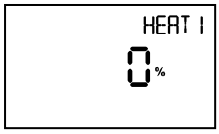
OR

6. Press either of the arrow keys to enter the Overrides submenu.
   Upon entering the Overrides submenu, the Damper parameter appears.



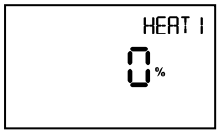
Screen timeout: 5 min

7. To scroll between the different parameters in the Overrides submenu, press the **Menu** button.



Screen timeout: 5 min

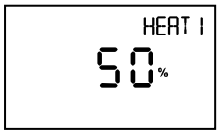
8. To override a parameter, use the arrow keys to modify the displayed percentage value.



Screen timeout: 5 min

OR

9. Press the **Menu** button to put the override into effect.



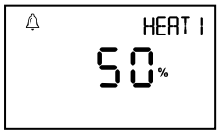
Screen timeout: 5 min

How to release overrides

The presence of the icon 🔔 in the display screen of a parameter in the Overrides submenu indicates that it is overridden. An override normally times out after two hours. However, it should be released manually when there is no use for it any more.

To manually release an override:

1. Press and hold both arrow keys simultaneously.

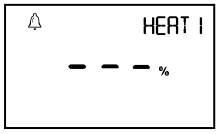


Screen timeout: 5 min

AND

The screen displays three dashes.

2. Press the **Menu** button.

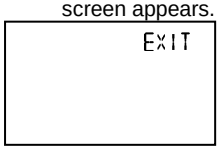


Screen timeout: 5 min

How to exit the Overrides submenu

To exit the Overrides submenu and go up one level, do one of the following:

- Press the **Menu** button several times until the Exit screen appears. Then press either of the arrow keys.



Screen timeout: 30 sec

OR

- Press and hold the **Menu** button for 5 seconds.

	Button Navigation Guide		
Advanced Menu			△ and ▽
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

CHAPTER 5
CONFIGURATION CODES

Configuring the preloaded applications of an ECL-VAV Series controller can be easily done using configuration codes. Three different sets of configuration codes exist for the following three categories:

- VAV Configuration
- Input Configuration
- Output Configuration

This chapter describes the use of codes in speeding up the configuration of ECL-VAV Series controllers.

In This Chapter

Advanced Menu	Button Navigation Guide		
			▲ and ▼
	- Enters Advanced menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter	- Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

Procedure for Submitting New Configuration Codes using an Allure EC-Smart-Vue

Using codes to configure a controller saves time, especially when working with large quantities. The following three submenus, in the Allure EC-Smart-Vue's Advanced menu, can be configured using codes:

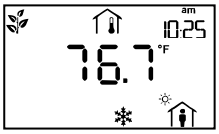
- VAV Configuration
- Input Configuration
- Output Configuration

For a full list of all the configuration codes, including an example of how one is calculated, see *Tables of Configuration Codes* on page 65.

How to Submit New Configuration Codes

To submit a new configuration code using an Allure EC-Smart-Vue:

1. Hold the **Menu** button for five seconds.

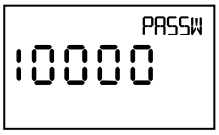


Screen timeout: none

5 sec

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.

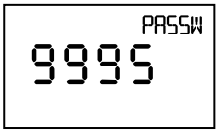


Screen timeout: 15 sec

OR

By default, the password is 9995.

3. Press the **Menu** button to submit the password.



Screen timeout: 15 sec

Upon submitting the correct password, the Advanced menu is entered and the Units submenu is displayed.

Screen timeout: 15 sec

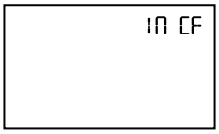
press several times

4. Press the **Menu** button several times until the desired submenu appears.

Either one of the following submenus can be configured using a code.

VAV Configuration | Input Configuration | Output Configuration

5. Press either of the arrow keys to enter the submenu.

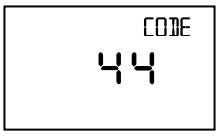


Screen timeout: 30 sec

OR

The Code parameter appears.

6. Use the arrow keys to enter a configuration code.



Screen timeout: 30 sec

OR

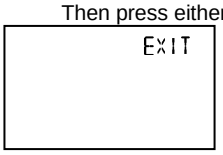
7. Press the **Menu** button to submit the new configuration code.

Screen timeout: 30 sec

How to exit the entered submenu

To exit the submenu that was entered and go up one level, do one of the following:

- Press the **Menu** button until the Exit screen appears. Then press either of the arrow keys.



Screen timeout: 30 sec

OR

- Press and hold the **Menu** button for 5 seconds.

Tables of Configuration Codes

The configuration codes for each controller model are presented in the tables below. But first, an example is given illustrating how to calculate a configuration code based on the desired configuration parameters.

As an example, suppose one wanted to configure the inputs of an ECL-VAV to have the following characteristics:

Input	Binary Code	Description of Binary Code
Universal Input 1	1	Space Temperature
Universal Input 2	4	Discharge Air Temperature
Universal Input 3	64	Occupancy Detection
Universal Input 4	0	Not Configured
Communication Sensor Setpoint	0	Cooling and Heating Setpoint via Allure EC-Smart-Vue
Sensors Type	0	Sensors are 10K Type II

The total of the binary codes is 69, which is the code to enter in the Input Configuration submenu that results in the inputs above.

For a full list of all the configuration codes per controller model, refer to the tables in the following pages.

ECL-VAV

VAV Configuration	ECL-VAV					
	Parameter	**Binary Code**	**Default**	**Valid Choices**		**Descriptions**
	BOX TYPE	0	x	0	SDUC	Single Duct VAV
		1		1	SFAN	Series Fan Single Duct VAV
		2		2	PFAN	Parallel Fan Single Duct VAV
	DUCTHEATER	0		0	NONE	No Duct Heater Reheat
		64	x	1	1ST	Duct Heater Reheat on Heat Source 1
		128		2	2ST	Duct Heater Reheat on Heat Sources 1 & 2
		192		3	3ST	Duct Heater Reheat on Heat Sources 1, 2, & 3
	HEATPRIO	0		0	DUCT	Duct Heating 1st
		4		1	PERI	Perimeter Heating 1st
		8	x	2	BOTH	Both Heating Simultaneously
	DUAL MAX	0	x	0	NO	Box is not using Dual Maximum Control Settings
		256		1	YES	Box is using Dual Maximum Control Settings
	HWREHEAT	0	x	0	NO	Duct Heater is not Hot Water Coil
		32		1	YES	Duct Heater Reheat by Hot Water Coil
	VVTMODE	0	x	0	NO	Box is using Flow Input
		8192		1	YES	Box is not Using Flow Input
	FLOATVLVPER	0	x	0	95 sec	95 sec drive time
		512		1	125 sec	125 sec drive time
		1024		2	150 sec	150 sec drive time
		1536		3	25 sec	25 sec drive time
		2048		4	30 sec	30 sec drive time
		2560		5	50 sec	50 sec drive time
		3072		6	60 sec	60 sec drive time
		3584		7	Custom	Drive time controlled by CustomFloatTime
	PWMVLVPER	0	x	0	25.5	0.1 to 25.5 sec
		4096		1	5.2	0.1 to 5.2 sec
	DAMPERDIR	0	x	0	CW	Damper Direction Clockwise (CW)
		16		1	CCW	Damper Direction Counter Clockwise (CCW)
	Default VAV Code	**72**				

	ECL-VAV					
	Parameter	**Binary Code**	**Default**	**Valid Choices**		**Descriptions**
Input Configuration	UI1TYPE	0		0	NONE	Not Configured
		1	x	1	SPAC	Room Temperature Sensor
		2		2	OCC	Occupancy Detection
		3		3	CONT	Window Contact
	UI2TYPE	0		0	NONE	Not Configured
		4		1	DISC	Discharge Air Temperature Sensor
		8		2	OCC	Occupancy Detection
		12		3	CONT	Window Contact
		16	x	4	SETP	Room Temperature Setpoint Offset
	UI3TYPE	0	x	0	NONE	Not Configured
		32		1	DISC	Discharge Air Temperature Sensor
		64		2	OCC	Occupancy Detection
		96		3	CONT	Window Contact
		128		4	FAN	Fan Powered Box Status
	UI4TYPE	0	x	0	NONE	Not Configured
		256		1	CO24	4-20mA CO2 Sensor (0-2000 ppm)
		512		2	CO25	0-5V CO2 Sensor (0-2000 ppm)
	COMSENS SP	0	x	0	DUAL	Cooling and Heating Setpoint via EC-Smart-Vue
		1024		1	OFFS	Room Temperature Setpoint Offset
	SENSORS TYPE	0	x	0	10-2	Sensors are 10K Type II
		2048		1	10-3	Sensors are 10K Type III
		4096		2	1000	Sensors are PT 1000
		6144		3	NI0C	Sensors are NI 1000 @0°C
		8192		4	NI22	Sensors are NI 1000 @22°C
	Default Input Code	**17**				

Tables of Configuration Codes

	ECL-VAV					
	Parameter	**Binary Code**	**Default**	**Valid Choices**		**Descriptions and Output Wiring Details**
Output Configuration	HEAT1	0		0	NONE	No Reheat
		1	x	1	DIG	Digital Reheat on DO1
		2		2	PWM TRIAC	Modulating PWM on DO1 and AO5
		3		3	PWM VLV	PWM Valve on DO1
		4		4	THERM VLV	Thermal Valve on DO1
		5		5	0-10V	Modulating 0-10V on AO5
		6		6	2-10V	Modulating 2-10V on AO5
		7		7	FLOAT VLV	Floating Valve (120 sec drive time) on DO1 & DO2
	HEAT2	0		0	NONE	No Reheat
		8	x	1	DIG	Digital Reheat on DO2 or DO3
		16		2	PWM TRIAC	Modulating PWM on (DO2 or DO3) and AO6
		24		3	PWM VLV	PWM Valve on DO2 or DO3
		32		4	THERM VLV	Thermal Valve on DO2 or DO3
		40		5	0-10V	Modulating 0-10V on AO6
		48		6	2-10V	Modulating 2-10V on AO6
		56		7	FLOAT VLV	Floating Valve on DO2 & DO3 or (DO3 and DO4)
	HEAT3	0	x	0	NONE	No Reheat
		64		1	DIG	Digital Reheat on DO3 or DO4
		128		2	PWM TRIAC	Modulating PWM on DO3 or DO4
		192		3	PWM VLV	PWM Valve on DO3 or DO4
		256		4	THERM VLV	Thermal Valve on DO3 or DO4
	HT1 NORM OPEN	0	x	0	NO	Heating1 Normally Close Valve
		512		1	YES	Heating1 Normally Open Valve
	HT2 NORM OPEN	0	x	0	NO	Heating2 Normally Close Valve
		1024		1	YES	Heating2 Normally Open Valve
	HT3 NORM OPEN	0	x	0	NO	Heating3 Normally Close Valve
		2048		1	YES	Heating3 Normally Open Valve
	Default Output Code	**9**				

ECL-VAVS-O

VAV Configuration	ECL-VAVS-O					
	Parameter	**Binary Code**	**Default**	**Valid Choices**		**Descriptions**
	HEATPRIO	0		0	DUCT	Duct Heating 1st
		1		1	PERI	Perimeter Heating 1st
		2	x	2	BOTH	Both Heating Simultaneously
	DAMPERDIR	0	x	0	CW	Damper Direction Clockwise (CW)
		4		1	CCW	Damper Direction Counter Clockwise (CCW)
	HWREHEAT	0	x	0	NO	Duct Heater is not Hot Water Coil
		8		1	YES	Duct Heater Reheat by Hot Water Coil
	DUCTHEATER	0		0	NONE	No Duct Heater Reheat
		16	x	1	1ST	Duct Heater Reheat on Heat Source 1
		32		2	2ST	Duct Heater Reheat on Heat Sources 1 & 2
	FLOATVLVPER	0	x	0	95 sec	95 seconds drive time
		64		1	125 sec	125 seconds drive time
		128		2	150 sec	150 seconds drive time
		192		3	25 sec	25 seconds drive time
		256		4	30 sec	30 seconds drive time
		320		5	50 sec	50 seconds drive time
		384		6	60 sec	60 seconds drive time
		448		7	Custom	Drive time controlled by CustomFloatTime
	COMSENS SP	0	x	0	DUAL	Cooling and Heating Setpoint via EC-Smart-Vue
		512		1	OFFS	Room Temperature Setpoint Offset
	PWMVLVPER	0	x	0	25.5	0.1 to 25.5 sec
		1024		1	5.2	0.1 to 5.2 sec
	VVTMODE	0	x	0	NO	Box is using Flow Input
		2048		1	YES	Box is not Using Flow Input
	Default VAV Code	**18**				

Tables of Configuration Codes

Output Configuration	ECL-VAVS-O					
	Parameter	**Binary Code**	**Default**	**Valid Choices**		**Descriptions and Output Wiring Details**
	HEAT1	0		0	NONE	No Reheat
		1	x	1	DIG	Digital Reheat on DO1
		2		2	PWM TRIAC	Modulating PWM on DO1 and AO3[1]
		3		3	PWM VLV	PWM Valve on DO1
		4		4	THERM VLV	Thermal Valve on DO1
		5		5	0-10V	Modulating 0-10V on AO3
		6		6	2-10V	Modulating 2-10V on AO3
		7		7	FLOAT VLV	Floating Valve (120 sec drive time) on DO1 & DO2
	HEAT2	0		0	NONE	No Reheat
		8	x	1	DIG	Digital Reheat on DO2
		16		2	PWM TRIAC	Modulating PWM on DO2
		24		3	PWM VLV	PWM Valve on DO2
		32		4	THERM VLV	Thermal Valve on DO2
		40		5	0-10V	Modulating 0-10V on AO3
		48		6	2-10V	Modulating 2-10V on AO3
	HT1 NORM OPEN	0	x	0	NO	Heating1 Normally Close Valve
		64		1	YES	Heating1 Normally Open Valve
	HT2 NORM OPEN	0	x	0	NO	Heating2 Normally Close Valve
		128		1	YES	Heating2 Normally Open Valve
	Default Output Code	**9**				

1. AO3 is not used with Heat Source 1 when Heat Type 2 is Analog 0-10V or Analog 2-10V

ECL-VAVS

VAV Configuration	ECL-VAVS					
	Parameter	**Binary Value**	**Default**	**Valid Choices**		**Descriptions**
	HEATPRIO	0		0	DUCT	Duct Heating 1st
		1		1	PERI	Perimeter Heating 1st
		2	x	2	BOTH	Both Heating Simultaneously
	DAMPERDIR	0	x	0	CW	Damper Direction Clockwise (CW)
		4		1	CCW	Damper Direction Counter Clockwise (CCW)
	HWREHEAT	0	x	0	NO	Duct Heater is not Hot Water Coil
		8		1	YES	Duct Heater Reheat by Hot Water Coil
	DUCTHEATER	0		0	NONE	No Duct Heater Reheat
		16	x	1	1ST	Duct Heater Reheat on Heat Source 1
		32		2	2ST	Duct Heater Reheat on Heat Sources 1 & 2
	DUAL MAX	0	x	0	NO	Box is not using Dual Maximum Control Settings
		64		1	YES	Box is using Dual Maximum Control Settings
	FLOATVLVPER	0	x	0	95 sec	95 seconds drive time
		128		1	125 sec	125 seconds drive time
		256		2	150 sec	150 seconds drive time
		384		3	25 sec	25 seconds drive time
		512		4	30 sec	30 seconds drive time
		640		5	50 sec	50 seconds drive time
		768		6	60 sec	60 seconds drive time
		896		7	Custom	Drive time controlled by CustomFloatTime
	PWMVLVPER	0	x	0	25.5	0.1 to 25.5 sec
		1024		1	5.2	0.1 to 5.2 sec
	VVTMODE	0	x	0	NO	Box is using Flow Input
		2048		1	YES	Box is not Using Flow Input
	Default VAV Code	**18**				

Tables of Configuration Codes

	ECL-VAVS					
	Parameter	**Binary Value**	**Default**	**Valid Choices**		**Descriptions**
Input Configuration	UI1TYPE	0		0	NONE	Not Configured
		1	x	1	SPAC	Room Temperature Sensor
		2		2	OCC	Occupancy Detection
		3		3	CONT	Window Contact
	UI2TYPE	0		0	NONE	Not Configured
		4		1	DISC	Discharge Air Temperature Sensor
		8		2	OCC	Occupancy Detection
		12		3	CONT	Window Contact
		16	x	4	SETP	Room Temperature Setpoint Offset
	COMSENS SP	0	x	0	DUAL	Cooling and Heating Setpoint via EC-Smart-Vue
		32		1	OFFS	Room Temperature Setpoint Offset
	SENSORS TYPE	0	x	0	10-2	Sensors are 10K Type II
		64		1	10-3	Sensors are 10K Type III
		128		2	1000	Sensors are PT 1000
		192		3	NI0C	Sensors are NI 1000 @0°C
		256		4	NI22	Sensors are NI 1000 @22°C
	Default Input Code	**17**				

Output Configuration	ECL-VAVS					
	Parameter	**Binary Value**	**Default**	**Valid Choices**		**Descriptions and Output Wiring Details**
	HEAT1	0		0	NONE	No Reheat
		1	x	1	DIG	Digital Reheat on DO1
		2		2	PWM TRIAC	Modulating PWM on DO1 and AO3[1]
		3		3	PWM VLV	PWM Valve on DO1
		4		4	THERM VLV	Thermal Valve on DO1
		5		5	0-10V	Modulating 0-10V on AO3
		6		6	2-10V	Modulating 2-10V on AO3
		7		7	FLOAT VLV	Floating Valve (120 sec drive time) on DO1 & DO2
	HEAT2	0		0	NONE	No Reheat
		8	x	1	DIG	Digital Reheat on DO2
		16		2	PWM TRIAC	Modulating PWM on DO2
		24		3	PWM VLV	PWM Valve on DO2
		32		4	THERM VLV	Thermal Valve on DO2
		40		5	0-10V	Modulating 0-10V on AO3
		48		6	2-10V	Modulating 2-10V on AO3
	HT1 NORM OPEN	0	x	0	NO	Heating1 Normally Close Valve
		64		1	YES	Heating1 Normally Open Valve
	HT2 NORM OPEN	0	x	0	NO	Heating2 Normally Close Valve
		128		1	YES	Heating2 Normally Open Valve
	Default Output Code	**9**				

1. AO3 is not used with Heat Source 1 when Heat Type 2 is Analog 0-10V or Analog 2-10V

ECL-VVTS

VAV Configuration	ECL-VVTS					
	Parameter	**Binary Value**	**Default**	**Valid Choices**		**Descriptions**
	HEATPRIO	0		0	DUCT	Duct Heating 1st
		1		1	PERI	Perimeter Heating 1st
		2	x	2	BOTH	Both Heating Simultaneously
	DAMPERDIR	0	x	0	CW	Damper Direction Clockwise (CW)
		4		1	CCW	Damper Direction Counter Clockwise (CCW)
	HWREHEAT	0	x	0	NO	Duct Heater is not Hot Water Coil
		8		1	YES	Duct Heater Reheat by Hot Water Coil
	DUCTHEATER	0		0	NONE	No Duct Heater Reheat
		16	x	1	1ST	Duct Heater Reheat on Heat Source 1
		32		2	2ST	Duct Heater Reheat on Heat Sources 1 & 2
	DUAL MAX	0	x	0	NO	Box is not using Dual Maximum Control Settings
		64		1	YES	Box is using Dual Maximum Control Settings
	FLOATVLVPER	0	x	0	95 sec	95 seconds drive time
		128		1	125 sec	125 seconds drive time
		256		2	150 sec	150 seconds drive time
		384		3	25 sec	25 seconds drive time
		512		4	30 sec	30 seconds drive time
		640		5	50 sec	50 seconds drive time
		768		6	60 sec	60 seconds drive time
		896		7	Custom	Drive time controlled by CustomFloatTime
	PWMVLVPER	0	x	0	25.5	0.1 to 25.5 seconds
		1024		1	5.2	0.1 to 5.2 seconds
	Default VAV Code	**18**				

	ECL-VVTS					
	Parameter	**Binary Value**	**Default**	**Valid Choices**		**Descriptions**
Input Configuration	UI1TYPE	0		0	NONE	Not Configured
		1	x	1	SPAC	Room Temperature Sensor
		2		2	OCC	Occupancy Detection
		3		3	CONT	Window Contact
	UI2TYPE	0		0	NONE	Not Configured
		4		1	DISC	Discharge Air Temperature Sensor
		8		2	OCC	Occupancy Detection
		12		3	CONT	Window Contact
		16	x	4	SETP	Room Temperature Setpoint Offset
	COMSENS SP	0	x	0	DUAL	Cooling and Heating Setpoint via EC-Smart-Vue
		32		1	OFFS	Room Temperature Setpoint Offset
	SENSORS TYPE	0	x	0	10-2	Sensors are 10K Type II
		64		1	10-3	Sensors are 10K Type III
		128		2	1000	Sensors are PT 1000
		192		3	NI0C	Sensors are NI 1000 @0°C
		256		4	NI22	Sensors are NI 1000 @22°C
	Default Input Code	**17**				

	ECL-VVTS					
	Parameter	**Binary Value**	**Default**	**Valid Choices**		**Descriptions and Output Wiring Details**
Output Configuration	HEAT1	0		0	NONE	No Reheat
		1	x	1	DIG	Digital Reheat on DO1
		2		2	PWM TRIAC	Modulating PWM on DO1 and AO3[1]
		3		3	PWM VLV	PWM Valve on DO1
		4		4	THERM VLV	Thermal Valve on DO1
		5		5	0-10V	Modulating 0-10V on AO3
		6		6	2-10V	Modulating 2-10V on AO3
		7		7	FLOAT VLV	Floating Valve (120 sec drive time) on DO1 & DO2
	HEAT2	0		0	NONE	No Reheat
		8	x	1	DIG	Digital Reheat on DO2
		16		2	PWM TRIAC	Modulating PWM on DO2
		24		3	PWM VLV	PWM Valve on DO2
		32		4	THERM VLV	Thermal Valve on DO2
		40		5	0-10V	Modulating 0-10V on AO3
		48		6	2-10V	Modulating 2-10V on AO3
	HT1 NORM OPEN	0	x	0	NO	Heating1 Normally Close Valve
		64		1	YES	Heating1 Normally Open Valve
	HT2 NORM OPEN	0	x	0	NO	Heating2 Normally Close Valve
		128		1	YES	Heating2 Normally Open Valve
	Default Output Code	**9**				

1. AO3 is not used with Heat Source 1 when Heat Type 2 is Analog 0-10V or Analog 2-10V

ECL-VAV-N

VAV Configuration	ECL-VAV-N					
	Parameter	**Binary Value**	**Default**	**Valid Choices**		**Descriptions**
	BOX TYPE	0	x	0	SDUC	Single Duct VAV
		1		1	SFAN	Series Fan Single Duct VAV
		2		2	PFAN	Parallel Fan Single Duct VAV
	HEATPRIO	0		0	DUCT	Duct Heating 1st
		4		1	PERI	Perimeter Heating 1st
		8	x	2	BOTH	Both Heating Simultaneously
	HWREHEAT	0	x	0	NO	Duct Heater is not Hot Water Coil
		16		1	YES	Duct Heater Reheat by Hot Water Coil
	DUCTHEATER	0		0	NONE	No Duct Heater Reheat
		32	x	1	1 ST	Duct Heater Reheat on Heat Source 1
		64		2	2 ST	Duct Heater Reheat on Heat Sources 1 & 2
	DUAL MAX	0	x	0	NO	Box is not using Dual Maximum Control Settings
		128		1	YES	Box is using Dual Maximum Control Settings
	FLOATVLVPER	0	x	0	95 sec	95 seconds drive time
		256		1	125 sec	125 seconds drive time
		512		2	150 sec	150 seconds drive time
		768		3	25 sec	25 seconds drive time
		1024		4	30 sec	30 seconds drive time
		1280		5	50 sec	50 seconds drive time
		1536		6	60 sec	60 seconds drive time
		1792		7	Custom	Drive time controlled by CustomFloatTime
	PWMVLVPER	0	x	0	25.5	0.1 to 25.5 sec
		2048		1	5.2	0.1 to 5.2 sec
	VVTMODE	0	x	0	NO	Box is using Flow Input
		4096		1	YES	Box is not Using Flow Input
	Default VAV Code	**40**				

Input Configuration	ECL-VAV-N					
	Parameter	**Binary Code**	**Default**	**Valid Choices**		**Descriptions**
	UI1TYPE	0		0	NONE	Not Configured
		1	x	1	SPAC	Room Temperature Sensor
		2		2	OCC	Occupancy Detection
		3		3	CONT	Window Contact
	UI2TYPE	0		0	NONE	Not Configured
		4		1	DISC	Discharge Air Temperature Sensor
		8		2	OCC	Occupancy Detection
		12		3	CONT	Window Contact
		16	x	4	SETP	Room Temperature Setpoint Offset
	UI3TYPE	0	x	0	NONE	Not Configured
		32		1	DISC	Discharge Air Temperature Sensor
		64		2	OCC	Occupancy Detection
		96		3	CONT	Window Contact
		128		4	FAN	Fan Powered Box Status
	UI4TYPE	0	x	0	NONE	Not Configured
		256		1	CO24	4-20mA CO2 Sensor (0-2000 ppm)
		512		2	CO25	0-5V CO2 Sensor (0-2000 ppm)
		768		3	DAMP 0-10V	0-10V Damper Position Feedback
		1024		4	DAMP 2-10V	2-10V Damper Position Feedback
	COMSENS SP	0	x	0	DUAL	Cooling and Heating Setpoint via EC-Smart-Vue
		2048		1	OFFS	Room Temperature Setpoint Offset
	SENSORS TYPE	0	x	0	10-2	Sensors are 10K Type II
		4096		1	10-3	Sensors are 10K Type III
		8192		2	1000	Sensors are PT 1000
		12288		3	NI0C	Sensors are NI 1000 @0°C
		16384		4	NI22	Sensors are NI 1000 @22°C
	Default Input Code	**17**				

Output Configuration	ECL-VAV-N					
	Parameter	**Binary Code**	**Default**	**Valid Choices**		**Descriptions and Output Wiring Details**
	HEAT1	0		0	NONE	No Reheat
		1	x	1	DIG	Digital Reheat on DO1
		2		2	PWM TRIAC	Modulating PWM on DO1 and AO5
		3		3	PWM VLV	PWM Valve on DO1
		4		4	THERM VLV	Thermal Valve on DO1
		5		5	0-10V	Modulating 0-10V on AO5
		6		6	2-10V	Modulating 2-10V on AO5
		7		7	FLOATING	Floating Valve (120 sec drive time) on DO1 & DO2
	HEAT2	0		0	NONE	No Reheat
		8	x	1	DIG	Digital Reheat on DO2 or DO3
		16		2	PWM TRIAC	Modulating PWM on DO2 and AO6 or just DO2 or just DO3
		24		3	PWM VLV	PWM Valve on DO2 or DO3
		32		4	THERM VLV	Thermal Valve on DO2 or DO3
		40		5	0-10V	Modulating 0-10V on AO6
		48		6	2-10V	Modulating 2-10V on AO6
	HT1 NORM OPEN	0	x	0	NO	Heating1 Normally Close Valve
		64		1	YES	Heating1 Normally Open Valve
	HT2 NORM OPEN	0	x	0	NO	Heating2 Normally Close Valve
		128		1	YES	Heating2 Normally Open Valve
	ACTUATOR TYPE	0	x	0	FLOAT	External Actuator Floating Type on DO3 and DO4
		256		1	0-10V	External Actuator 0-10V on AO6
		512		2	2-10V	External Actuator 2-10V on AO6
		768		3	10-0V	External Actuator 10-0V on AO6
		1024		4	10-2V	External Actuator 10-2V on AO6
	ACTUATOR DRIVE TIME	0	x	0	95 S	95 sec drive time
		1024		1	45 S	45 sec drive time
		2048		2	60 S	60 sec drive time
		3072		3	90 S	90 sec drive time
		4096		4	108 S	108 sec drive time
		5120		5	125 S	125 sec drive time
		6144		6	150 S	150 sec drive time
		7168		7	Custom	Custom Damper Drive Time
	Default Output Code	**9**				

APPENDIX A
DOCUMENTATION IMPROVEMENT FORM

Is any part of this document not clear enough? Are there any comments about the content of this document? Do not hesitate to use this form to send us comments and recommendations, as there is always a drive to improve documentation to further satisfy clients.

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