

# ECL-PTU-308 Preloaded Applications

## User Guide

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**DISTECH**  
CONTROLS™

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an  **AcuityBrands** company

Innovative Solutions for Greener Buildings™

# Document Revision History

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- ☐ Updated wiring diagrams

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- ☐ Updated accessibility with EC-Net 4

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- ☐ Removed EC-Net<sup>AX</sup> sections
- ☐ Updated Configuration Assistant section

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# Introduction to the Preloaded Applications

Distech Controls' ECL-PTU controllers come preloaded with code containing standard applications. This code was created using EC-*gfx*Program, 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<sup>AX</sup> Pro, which is powered by the Niagara<sup>AX</sup> Framework®. dc *gfx*Applications provides an intuitive interface for configuring controllers.

Alternatively, an Allure™ EC-Smart-View Sensor can be used to configure a controller's preloaded applications on site.

Controllers can also be custom-programmed using EC-*gfx*Program. With this GPI tool, quick and easy control sequences can be created which meet the most demanding requirements of any engineering specification.

## Applications Comparison Chart

|                    | ECL-PTU-107                                                                                                                                                                                                   | ECL-PTU-207                                                                                                                                                                                                   | ECL-PTU-307                                                                                                                                                                                                   | ECL-PTU-208                                                                                                                                                                                                   | ECL-PTU-308                                                                                                                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fan Type           | None<br>OR<br>3-speed                                                                                                                                                                                         | None<br>OR<br>3-speed<br>OR<br>variable speed                                                                                                                                                                 | None<br>OR<br>3-speed<br>OR<br>variable speed                                                                                                                                                                 | None<br>OR<br>3-speed<br>OR<br>variable speed                                                                                                                                                                 | None<br>OR<br>3-speed<br>OR<br>variable speed                                                                                                                                                                 |
| Electric Heater    | 1                                                                                                                                                                                                             | 1                                                                                                                                                                                                             | 1                                                                                                                                                                                                             | 1                                                                                                                                                                                                             | 1                                                                                                                                                                                                             |
| Valve Outputs Type | 2 x PWM valves<br>OR<br>2 x On/Off valves<br>OR<br>1 x floating valve                                                                                                                                         | 2 x PWM valves<br>OR<br>2 x On/Off valves<br>OR<br>1 x floating valve<br>AND<br>2 x 0-10V valves                                                                                                              | 2 x PWM valves<br>OR<br>2 x On/Off valves<br>OR<br>2 x floating valves<br>OR<br>2 x 0-10V valves*                                                                                                             | 2 x PWM valves<br>OR<br>2 x On/Off valves<br>OR<br>1 x floating valve<br>OR<br>2 x 0-10V valves*                                                                                                              | 2 x PWM valves<br>OR<br>2 x On/Off valves<br>OR<br>2 x floating valves<br>OR<br>2 x 0-10V valves*                                                                                                             |
| Valve Voltage      | 100-240 VAC                                                                                                                                                                                                   | 100-240 VAC                                                                                                                                                                                                   | 100-240 VAC                                                                                                                                                                                                   | 24 V                                                                                                                                                                                                          | 24 V                                                                                                                                                                                                          |
| System Type        | 2 pipes cooling only<br>OR<br>2 pipes cooling only with electric heater<br>OR<br>2 pipes change-over<br>OR<br>2 pipes change-over with electric heater<br>OR<br>4 pipes<br>OR<br>4 pipes with electric heater | 2 pipes cooling only<br>OR<br>2 pipes cooling only with electric heater<br>OR<br>2 pipes change-over<br>OR<br>2 pipes change-over with electric heater<br>OR<br>4 pipes<br>OR<br>4 pipes with electric heater | 2 pipes cooling only<br>OR<br>2 pipes cooling only with electric heater<br>OR<br>2 pipes change-over<br>OR<br>2 pipes change-over with electric heater<br>OR<br>4 pipes<br>OR<br>4 pipes with electric heater | 2 pipes cooling only<br>OR<br>2 pipes cooling only with electric heater<br>OR<br>2 pipes change-over<br>OR<br>2 pipes change-over with electric heater<br>OR<br>4 pipes<br>OR<br>4 pipes with electric heater | 2 pipes cooling only<br>OR<br>2 pipes cooling only with electric heater<br>OR<br>2 pipes change-over<br>OR<br>2 pipes change-over with electric heater<br>OR<br>4 pipes<br>OR<br>4 pipes with electric heater |

Table 1: Available configurations

\*: if neither ECM Fan (Variable Speed) nor Damper are used.

## Purpose of the User Guide

This user guide is intended to provide information and instruct a user to configure an ECL-PTU controller from its preloaded applications using either *EC-gfxProgram* or an Allure EC-Smart-View sensor. However, this guide is not designed to instruct the user on how to use an ECL-PTU controller. For information on this controller series, refer to its datasheet and to the [EC-gfxProgram 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.



# Variables

## Enum Constants

### ConfigOccSensor (ConstantEnum1)

This variable is used to configure the source of the motion detection sensor.

| ID              | Enumeration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Default Value |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Constant Enum 1 | 0 = Unused: The system is not using any occupancy detection, the final occupancy is equal to the occupancy received from the BMS system, except if the device is a Slave device.<br>1 = Multi-Sensor : The system is using the EC-Multi-Sensor to receive the occupancy detection information<br>2 = ComSensor : The system is using the EC-Smart-Vue to receive the occupancy detection information<br>3 = DigitalInput : The system is using a Digital Input on DI6 to receive the occupancy detection information.<br>4 = Auto/All : The system is using any occupancy sensor connect to receive the motion detection information. If only one sensor is occupied, the variable MotionSensor(MSV5) is set to occupied. | Auto/All      |

### UI2Config (ConstantEnum2)

This variable is used to configure the source of Hardware Input 2.

| ID              | Enumeration                                                                                                                                                                                                                                                                                                                                                                                                          | Default Value |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Constant Enum 2 | 0 = Unused : Hardware Input 2 is not used.<br>1 = Discharge Temp : Hardware Input 2 is used to connect the Discharge Temperature sensor<br>2 = Return Temp: Hardware Input 2 is used to connect the Return air Temperature sensor<br>3 = Return Temp: Hardware Input 2 is used to connect the Water Temperature sensor<br>4 = SpOffset: Hardware Input 2 is used to connect the setpoint offset of the EC-Sensor-SO. | SpOffset      |

### DI4Config (ConstantEnum3)

This variable is used to configure the hardware Input 4.

| ID              | Enumeration                                                                                                                                                                                                                                                                                   | Default Value   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Constant Enum 3 | 0 = Unused: Hardware Input is not used.<br>1 = WindowContactNO : Hardware Input is used to connect a normally opened window contact. (Contact close = Window Open)<br>2 = WindowContactNC : Hardware Input is used to connect a normally close window contact. (Contact close = Window Close) | WindowContactNC |

## DI5Config (ConstantEnum4)

This variable is used to configure hardware Input 5.

| ID              | Enumeration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Default Value |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Constant Enum 4 | 0 = Unused: Hardware Input 5 is not used.<br>1 = AuxContactNO : Hardware Input 5 is used to connect a normally open auxiliary contact.<br>2 = AuxContactNC : Hardware Input 5 is used to connect a normally close auxiliary contact.<br>3 = ChangOverHtg : Hardware Input 5 is used to connect a change-over input. (Contact close = Ceating mode)<br>4 = ChangOverClg : Hardware Input 5 is used to connect a change-over input. (Contact close = Cooling mode)<br>5 = CondSensorNO : Hardware Input 5 is used to connect a normally open condensation sensor. (Contact close = Alarm)<br>6 = CondSensorNC : Hardware Input 5 is used to connect a normally close condensation sensor. (Contact close = Normal) | Unused        |

## DI6Config (ConstantEnum5)

This variable is used to configure hardware Input 6.

| ID              | Enumeration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Default Value |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Constant Enum 5 | 0 = Unused: Hardware Input 6 is not used.<br>1 = AuxContactNO : Hardware Input 6 is used to connect a normally open auxiliary contact.<br>2 = AuxContactNC : Hardware Input 6 is used to connect a normally close auxiliary contact.<br>3 = ChangOverHtg : Hardware Input 6 is used to connect a change-over input. (Contact close = Ceating mode)<br>4 = ChangOverClg : Hardware Input 6 is used to connect a change-over input. (Contact close = Cooling mode)<br>5 = OccSensorNO : Hardware Input 6 is to connect a normally open occupancy sensor. configured to occupancy sensor normaly open. (Contact close = occupied)<br>6 = OccSensorNC : Hardware Input 6 is to connect a normally close occupancy sensor. configured to occupancy sensor normaly open. (Contact close = unoccupied) | AuxContactNO  |

## SystemType (ConstantEnum6)

This variable is used to configure the system type of the installation.

| ID              | Enumeration                                                                                                                                                                                                                                                                                                                                                                                | Default Value |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Constant Enum 6 | 0 = Cool : 2 pipes cooling only<br>1 = CoolElectHeat : 2 pipes cooling only with electric heater<br>2 = heat : 2 pipes heating only<br>3 = CoolElectHeat : 2 pipes heating only with electric heater<br>4 = ChgOver: 2 pipes change-over<br>5 = ChgOverElectHeat: 2 pipes change-over with electric heater<br>6 = CoolHeat: 4 pipes<br>7 = CoolHeatElectHeat: 4 pipes with electric heater | CoolHeat      |

## CoolVaveType (ConstantEnum7)

This variable is used to configure the Cooling or Change-Over Valve.

| ID              | Enumeration                                                                                                                                                                                                                                                                                                                                            | Default Value |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Constant Enum 7 | 0 = Unused: The valve is not used.<br>1 = 0-10V: Only AO7 or AO8 is used to control the valve (depending Damper and Fan configuration)<br>2 = Thermal: DO5 is used to control the thermal valve.<br>3 = On-Off: DO5 is used to control the digital valve<br>4 = Floating: DO5 and DO6 (DO5 = Open, DO6 = Close) are used to control the Floating valve | Floating      |

See IO assignement section for more details.

## HeatValveType (ConstantEnum8)

This variable is used to configure the Heating Valve.

| ID              | Enumeration                                                                                                                                                                                                                                                                                                                                                     | Default Value |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Constant Enum 8 | 0 = Unused: The valve is not used.<br>1 = 0-10V: Only AO7 or AO8 are used to control the valve (depending the damper and fan configuration)<br>2 = Thermal: DO9 is used to control the thermal valve.<br>3 = On-Off: DO9 is used to control the digital valve.<br>4 = Floating: DO9 and DO10 (DO9 = Open, DO10 = Close) are used to control the Floating valve. | Floating      |

See IO assignement section for more details.

## DamperCtrlType (ConstantEnum9)

This variable is used to configure the damper control type or disabled the damper control.

| ID              | Enumeration                                                                                                                     | Default Value |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------|---------------|
| Constant Enum 9 | 0 = None: Damper Control is disabled.<br>1 = 0-10V : Damper used 0-10V signal type.<br>2 = 2-10V: Damper used 0-10V signal type | 0-10V         |

See IO assignement section for more details.

## Hardware Inputs

### UI1: CO2 Sensor

This input is used to connect a space or return CO2 sensor.

The variable CO2Range (NumericConstant2) can be used to configure the range of the CO2 sensor. The default value is 2000 ppm.

| ID           | Units     | Valid Range | Default Value |
|--------------|-----------|-------------|---------------|
| nvoHwInput_1 | Volts (V) | 0.1 to 10 V | Null          |

### UI2: UI2

This input is used to connect the Discharge Temperature, Return Temperature, Water Temperature or Setpoint Offset. It is configurable using UI2Config (EnumConstant2) .

| ID           | Units             | Valid Range         | Default Value |
|--------------|-------------------|---------------------|---------------|
| nvoHwInput_2 | Ohms ( $\Omega$ ) | 0 to 55000 $\Omega$ | 0 $\Omega$    |

### SI3: SI3

This input is used to connect the Discharge Temperature, Return Temperature, Water Temperature or Space Temperature. It is configurable using nciMiscConfig.SI3Config (nviFP44) .

| ID           | Units                                  | Valid Range                  | Default Value |
|--------------|----------------------------------------|------------------------------|---------------|
| nvoHwInput_3 | Degrees-Celsius ( $^{\circ}\text{C}$ ) | -10 to 50 $^{\circ}\text{C}$ | Null          |

### DI4: DI4

This variable is used to connect the window contact. Note that reversing the window contact operation using DI4Config (EnumConstant3) will not reverse this input. To display the status of the window contact, one should use the variable nvoWindowContact (nvoFP24).

| ID           | Units       | Valid Range           | Default Value |
|--------------|-------------|-----------------------|---------------|
| nvoHwInput_4 | Snvt_Switch | 0 to 100% / On to Off | 0 % / Off     |

### DI5: DI5

This input is used to connect Auxiliary Contact, Change Over State (heating/cooling) or Condensation sensor. It is configurable via DI5Config (EnumConstant4).

| ID           | Units       | Valid Range           | Default Value |
|--------------|-------------|-----------------------|---------------|
| nvoHwInput_5 | Snvt_Switch | 0 to 100% / On to Off | 0 % / Off     |

### DI6: DI6

This input is used to connect Auxiliary Contact, Change Over State (heating/cooling) or Occupation sensor. It is configurable via DI6Config (EnumConstant5) .

| ID           | Units       | Valid Range           | Default Value |
|--------------|-------------|-----------------------|---------------|
| nvoHwInput_6 | Snvt_Switch | 0 to 100% / On to Off | 0 % / Off     |

## EC-Smart-Vue: Humidity display

This input is used to display the Allure EC-Smart-Vue humidity reading if an Allure EC-Smart-Vue equipped with a humidity option is connected to the system.

| ID                | Units                            | Valid Range  | Default Value |
|-------------------|----------------------------------|--------------|---------------|
| nvoComSensor01_04 | Percent Relative Humidity (% RH) | 0 to 100 %RH | NaN           |

## EC-Smart-Vue: Temperature display

This input is used to display the Allure EC-Smart-Vue temperature reading if an Allure EC-Smart-Vue is connected to the system.

| ID                | Units                | Valid Range | Default Value |
|-------------------|----------------------|-------------|---------------|
| nvoComSensor01_04 | Degrees-Celsius (°C) | 0 to 50°C   | NaN           |

## EC-Smart-Vue: CO<sub>2</sub> display

This input is used to display the Allure EC-Smart-Vue CO<sub>2</sub> concentration reading if an Allure EC-Smart-Vue equipped with a CO<sub>2</sub> sensor is connected to the system.

| ID                | Units | Valid Range   | Default Value |
|-------------------|-------|---------------|---------------|
| nvoComSensor01_04 | ppm   | 0 to 2000 ppm | NaN           |

## Hardware Outputs

### DO1: FanSpeed1 / Fan Start

This output is used to control Fan Speed 1 or Fan Start based on the configuration of nciFanSettings.FanCtrlType (nviFP39).

| ID            | Units        | Valid Range             | Default Value |
|---------------|--------------|-------------------------|---------------|
| nvoHwOutput_1 | Start / Stop | Start to Stop (Boolean) | Stop          |

### DO2: FanSpeed2 / Damper

This output is used to control Fan Speed 2 only if nciFanSettings.FanCtrlType (nviFP39) is set to 3-speed fan or to control a digital damper based on occupancy status only if nciFanSettings.FanCtrlType (nviFP39) is set to none, onespeed, or VarSpeed.

| ID            | Units        | Valid Range             | Default Value |
|---------------|--------------|-------------------------|---------------|
| nvoHwOutput_2 | Start / Stop | Start to Stop (Boolean) | Stop          |

### DO3: FanSpeed3

This output is used to control Fan Speed 3 only if nciFanSettings.FanCtrlType (nviFP39) is set to 3-speed fan.

| ID            | Units        | Valid Range             | Default Value |
|---------------|--------------|-------------------------|---------------|
| nvoHwOutput_3 | Start / Stop | Start to Stop (Boolean) | Stop          |

### DO4: ElectHeatCmd

This output is used to control the Electric Heater relay. Do NOT manually override this output to Active since the electric heater will not be linked to the fan start anymore.

| ID            | Units        | Valid Range             | Default Value |
|---------------|--------------|-------------------------|---------------|
| nvoHwOutput_4 | Start / Stop | Start to Stop (Boolean) | Stop          |

### DO5: Valve DO5

This output is used to control the cooling valve or the open output of the cooling floating valve.

- ☐ When CoolValveType (EnumConstant7) is set to either Thermal or On/Off, this output will control the cooling valve.
- ☐ When CoolValveType (EnumConstant7) is set to Floating, this output is used to open the cooling valve.

The normally closed / normally opened setting of the output can be changed using CoolValveConfig (BooleanConstant5).

| ID            | Units         | Valid Range | Default Value |
|---------------|---------------|-------------|---------------|
| nvoHwOutput_5 | Percent (PWM) | 0 to 100%   | 0%            |

## DO6: Valve DO6

This output is used to control the cooling valve or the close output of the cooling floating valve.

- ☐ When CoolValveConfig (BooleanConstant5) is set to either Thermal or On/Off, this output will control the cooling valve.
- ☐ When CoolValveType (EnumConstant7) is set to Floating, this output is used to close the cooling valve.

The normally close / normally open setting of the output can be changed using CoolValveConfig (BooleanConstant5).

| ID            | Units         | Valid Range | Default Value |
|---------------|---------------|-------------|---------------|
| nvoHwOutput_6 | Percent (PWM) | 0 to 100%   | 0%            |

## AO7: AO7

This output is used to control the variable fan speed operation if nciFanSettings.FanCtrlType (nviFP39) is set to Variable fan. If nciFanSettings.FanCtrlType (nviFP39) is not set to Variable Fan, this output is used to control valves (heating or cooling) depending on the configuration of CoolValveType (EnumConstant7) and HeatValveType (EnumConstant8) .

| ID            | Units       | Valid Range | Default Value |
|---------------|-------------|-------------|---------------|
| nvoHwOutput_7 | Percent (%) | 0 to 100%   | 0%            |

## AO8: AO8

This output is used to control an analog damper if DamperCtrlType (EnumConstant9) is set to 0-10V or 2-10V.

If DamperCtrlType (EnumConstant9) is set to None, this output is used to control valves (heating or cooling) depending on the configuration of CoolValveType (EnumConstant7) and HeatValveType (EnumConstant8) .

| ID            | Units       | Valid Range | Default Value |
|---------------|-------------|-------------|---------------|
| nvoHwOutput_8 | Percent (%) | 0 to 100%   | 0%            |

## DO9: ValveDO9

This output is used to control the heating valve or the open output of the heating floating valve.

- ☐ When HeatValveType (EnumConstant8) ) is set to either Thermal or On/Off, this output will control the heating valve.
- ☐ When HeatValveType (EnumConstant8) is set to Floating, this output is used to open the heating valve.

The normally closed / normally opened setting of the output can be changed using HeatValveConfig (BooleanConstant4).

| ID            | Units         | Valid Range | Default Value |
|---------------|---------------|-------------|---------------|
| nvoHwOutput_9 | Percent (PWM) | 0 to 100%   | 0%            |

## DO10: ValveDO10

This output is used to control the close output of the heating valve when HeatValveType (EnumConstant8) is set to floating.

| ID             | Units         | Valid Range | Default Value |
|----------------|---------------|-------------|---------------|
| nvoHwOutput_10 | Percent (PWM) | 0 to 100%   | 0%            |

## Network Variables Input

### nviSpaceTemp

This variable is used to receive the Space Temperature from an external node on the network.

This variable has priority over the local space temperature inputs. If this variable is received, the controller will use this value to control and will output the value in nvoSpaceTemp.

The only variable that can override nviSpaceTemp is nviSpaceTempAvg. For more details, refer to nviSpaceTempAvg(nviFP15).

| ID           | Units            | Valid Range | Default Value |
|--------------|------------------|-------------|---------------|
| nviSpaceTemp | SNVT_Temp_p (°C) | -10 to 50°C | 327,67°C      |

### nviSetpoint (nviFP01)

This input network variable is used to allow the temperature setpoints for the occupied and standby modes to be changed via the network.

If a valid value is not present, either a locally wired setpoint knob or the appropriate setpoint as configured in nciSetpoints will be used.

Note: The unoccupied setpoints are not changed.

The effective heat/cool setpoints for the occupied and standby modes are derived from nciSetpoints plus the absolute setpoint offset, calculated as the difference between nviSetpoint and the mean of the occupied\_heat and occupied\_cool setpoints defined in nciSetpoints:

- ☐  $\text{abs\_setpoint\_offset} = \text{nviSetpoint} - (\text{occupied\_cool} + \text{occupied\_heat})/2$
- ☐  $\text{effective\_occupied\_cool} = \text{occupied\_cool} + \text{abs\_setpoint\_offset}$
- ☐  $\text{effective\_occupied\_heat} = \text{occupied\_heat} + \text{abs\_setpoint\_offset}$
- ☐  $\text{effective\_standby\_cool} = \text{standby\_cool} + \text{abs\_setpoint\_offset}$
- ☐  $\text{effective\_standby\_heat} = \text{standby\_heat} + \text{abs\_setpoint\_offset}$

If nviSetpoint and nviSetptOffset are used together, the result on the effective setpoints is cumulative.

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nviFP01 | SNVT_Temp_p (°C) | 10 to 35°C  | 327,67°C      |

### nviSpOffset (nviFP02)

This input network variable is used to shift the effective occupied and standby temperature setpoints by adding nviSetptOffset to the current setpoints.

It is typically bound to a supervisory node or to an external wall module having a relative setpoint knob.

All occupied and standby setpoints will be shifted upward (+) or downward (-) by the value of nviSpOffset.

Note: The unoccupied setpoints are not changed.

If nviSetpoint and nviSetptOffset are used together, the result on the effective setpoints is cumulative.

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nviFP02 | SNVT_Temp_p (°C) | -10 to 10°C | 327,67°C      |



## nviOccManCmd (nviFP03)

This input network variable is used to command the Controller into different occupancy modes.

It is typically sent by a wall-mounted occupant interface module or supervisory node, to manually control occupancy modes, or override the scheduled occupancy.

If a local Bypass Input is present, it can be used in conjunction with this network variable input.

The local input, when active, forces a Bypass request (equivalent to OC\_BYPASS), overriding nviOccManCmd for the duration of the Local Bypass Time (determined by the configuration property nciBypassTime).

When nviOccManCmd indicates OC\_BYPASS, the Local Bypass Time is also used.

Whenever an update of nviOccManCmd is received indicating OC\_BYPASS, the bypass timer is restarted.

This input is used in conjunction with nviSchedule1 and nviOccSensor (if installed) to determine the effective occupancy mode.

Refer to nvoEffectOccup(nvoFP02) for more information.

| ID      | Units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Default Value |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| nviFP03 | SNVT_Occupancy<br>0 = OC_OCCUPIED: The Space Comfort Controller should operate in the occupied mode<br>1 = OC_UNOCCUPIED: The Space Comfort Controller should operate in the unoccupied mode<br>2 = OC_BYPASS: The Space Comfort Controller should operate in the occupied mode for a period of time defined by nciBypassTime.<br>3 = OC_STANDBY: The Space Comfort Controller should operate in the standby mode<br>0xFF = OC_NUL: This is the initial value after power-up and it remains until another value is received. It is used to indicate that this network variable input is invalid, unused or to cancel a previous command. | 0xFF = OC_NUL |

## nviOccSensor (nviFP04)

This input network variable is used to indicate the presence of occupants in the controlled space and it is typically sent by an occupancy sensor.

In cases where an occupancy sensor is hardwired to the Space Comfort Controller, a valid value for nviOccSensor will take precedence over the hardwired input.

This input is used in conjunction with nviSchedule1 and nviOccManCmd (if installed) to determine the effective occupancy mode.

Refer to nvoEffectOccup(nvoFP02) for more information.

| ID      | Units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Default Value |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| nviFP04 | SNVT_occupancy<br>0 = OC_OCCUPIED: The occupancy sensor is indicating that there ARE occupants in the space.<br>1 = OC_UNOCCUPIED: The occupancy sensor is indicating that there are NO occupants in the space.<br>0xFF = OC_NUL: This is the initial value after power-up and it remains until another value is received. It is used to indicate that this network variable input is invalid or unused. OC_NUL is equivalent to OC_OCCUPIED.<br>All other enumerations are handled as equivalent to OC_NUL. | OC_NUL        |

## nviApplicMode (nviFP05)

This network variable input is used to coordinate the Space Comfort Controller with any supervisory controller.

If a mode that is not supported by the unit controller is requested, the unit controller will use HVAC\_AUTO.

The nviApplicMode overrides the local control of nvoHeatCool.

Refer to nvoHeatCool(nvoFP03) for more information.

| ID      | Units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Default Value |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| nviFP05 | SNVT_hvac_mode<br>0 = HVAC_AUTO (Mode determined by unit)<br>1 = HVAC_HEAT (Use heat setpoints)<br>2 = HVAC_MRNG_WRMUP (Morning warmup)<br>3 = HVAC_COOL (Use cool setpoints)<br>4 = HVAC_NIGHT_PURGE (Free cooling)<br>5 = HVAC_PRE_COOL (Morning cooldown)<br>6 = HVAC_OFF (No unit operation allowed)<br>7 = HVAC_TEST (Special test mode, manufacturer-defined)<br>8 = HVAC_EMERG_HEAT (Emergency heat)<br>0xFF = HVAC_NUL (same as HVAC_AUTO)<br>All other enumerations will be interpreted as HVAC_AUTO | HVAC_AUTO     |

## nviFanSpeedCmd (nviFP06)

This input network variable is used to override the local fan speed operation.

The system can be configured to use this variable as a 3 speed fan override or a variable speed fan override.

To use this input as a 3 speed fan override, the Boolean constant nviFanSpeedCmdDigital (nciCb01\_124/ConstantBool3) must be set to true.

When in 3 speed fan operating mode, the requested speed (Off, 1,2,3,Auto) are linked to the values of nciFanSettings.FanSpeed1Level, FanSpeed2Level and FanSpeed3Level (nviFP39).

When nviFanSpeedCmd is not in Auto mode, the fan will be set to the value of either FanSpeed1Level, FanSpeed2Level or FanSpeed3Level based on the received information from nviFanSpeedCmd.

When in variable fan speed operating mode, if not in auto mode the fan output will be set to the value received by nviFanSpeedCmd.

| State | Value       | Equivalent Percent | Request Speed |
|-------|-------------|--------------------|---------------|
| 0     | N/A         | 0 %                | OFF           |
| 0     | 0 to 100    | 0 %                | OFF           |
| 1     | 0.5 to 33   | 1 to 33%           | SPEED 1       |
| 1     | 33.1 to 66  | 33.1 to 66%        | SPEED 2       |
| 1     | 66.1 to 100 | 66.1 to 100%       | SPEED 3       |
| -1    | N/A         | AUTO               | AUTO          |

| ID      | Units       | Default Value |
|---------|-------------|---------------|
| nviFP06 | SNVT_switch | 0% / -1       |

## nviAuxHeatEnable (nviFP08)

This input is used to disable auxiliary heat operation.

This input is typically sent from a system supervisor panel. For example, during peak electrical demand periods, electric heat operation could be disabled.

It is also possible to have a hardwired input to a unit controller to be used for auxiliary heat enable.

In instances where both a hardwired input and network input are present, the network variable has precedence over the physical input.

This input can be used for simple enable/disable functions, or can be used to enable a portion of the unit's auxiliary heat capacity. Values less than 100% are used to limit the electric heater operation to the specified level.

| State | Value       | Equivalent percent | Auxiliary Heat Operation |
|-------|-------------|--------------------|--------------------------|
| 0     | N/A         | 0%                 | Limited 0% (disabled)    |
| 1     | 0           | 0%                 | Limited 0% (disabled)    |
| 1     | 0,5 to 99,5 | 0,5 to 99,5%       | Limited (Enabled)        |
| 1     | 100%        | 100%               | Not limited (Enabled)    |
| -1    | N/A         | N/A                | Not limited (Invalid)    |

| ID      | Units       | Default Value |
|---------|-------------|---------------|
| nviFP08 | SNVT_switch | 0% / -1       |

## nviEnergyHoldOff (nviFP09)

This input is used to stop heating and cooling while allowing the unit to protect the space from extreme temperatures.

When the unit is in Energy Hold Off, the unit will not operate unless the space temperature exceeds the frost protection setpoint (nciMiscConfig.FrostProtSp (nviFP44)).

This input is usually associated with a device such as a window contact sensor.

If a physical sensor is connected and the network variable is present, the network variable has priority over the physical input.

| State | Value    | Energy Hold Off  | State |
|-------|----------|------------------|-------|
| 0     | N/A      | Normal           | 0     |
| 1     | 0        | Normal           | 1     |
| 1     | 1 to 100 | Energy Hold Off  | 1     |
| -1    | N/A      | Normal (Invalid) | -1    |

| ID      | Units       | Default Value |
|---------|-------------|---------------|
| nviFP09 | SNVT_switch | 0% / -1       |

## nviSourceTemp (nviFP10)

This input network variable is used to indicate the temperature of water being supplied to the unit for heating and/or cooling capacity.

Valid values of nviSourceTemp have priority over local sensor values.

When using 2 pipes change-over systems, this value will be used to determine the heat/cool mode.

See nvoChgOver (nvoFP21) for more information about the heat/cool management.

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nviFP10 | SNVT_temp_p (°C) | 0 to 100°C  | 327,67°C      |

## nviOutdoorTemp (nviFP11)

This input network variable represents information from an outdoor air temperature sensor.

This value is typically generated from either a communicating sensor or a supervisory controller. The unit may also have a locally wired outdoor air temperature sensor.

Valid values of nviOutdoorTemp have priority over local sensor values.

This network variable is used to display the outside temperature on the EC-Smart-View sensor if configured.

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nviFP11 | SNVT_temp_p (°C) | -50 to 50°C | 327,67°C      |

## nviSpaceCO2 (nviFP13)

This input network variable measures the space CO2.

The unit can also have a locally wired sensor or use the Allure EC-Smart-View or EC-Smart-Air integrated CO2 sensor.

Valid values of nviSpaceCO2 have priority over local sensor values.

| ID      | Units    | Valid Range   | Default Value |
|---------|----------|---------------|---------------|
| nviFP13 | SNVT_ppm | 0 to 5000 ppm | 65535 ppm     |

## nviTerminalLoad (nviFP14)

This network variable, when used with nvoTerminalLoad from another controller can be used to coordinate master/slave operation.

When a controller has multiple outputs for heating, cooling, and fan speed this one connection can replace multiple connections for parallel operation.

| ID      | Units                | Valid Range  | Default Value |
|---------|----------------------|--------------|---------------|
| nviFP14 | SNVT_lev_percent (%) | -100 to 100% | 163,835%      |

## nviSpaceTempAvg (nviFP15)

This variable is used to receive the Space Temperature readings of slave controllers.

When connected to the nvoLocalSpaceTemp of slave controllers using Fan-In bindings, the master controller will automatically calculate the average space temperature of the zone.

The controller will then use this value to control the space and output this value via nvoSpaceTemp.

This variable has priority over the local space temperature inputs and nviSpaceTemp.

The slave controllers can then use this temperature if a binding is made between nvoSpaceTemp of the master controller and nviSpaceTemp of the slave controllers.

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nviFP15 | SNVT_temp_p (°C) | -10 to 50°C | 327,67°C      |

## nviOutdoorCO2 (nviFP16)

This input network variable measures the outdoor space CO2.

When this value is received, the local unit will automatically adjust the space CO2 setpoint using nviOutdoorCO2 and nciDamperSettings/outdoorCO2Offset (nviFP40).

SpaceCO2Setpoint = nviOutdoorCO2 + outdoorCO2Offset

| ID      | Units    | Valid Range     | Default Value |
|---------|----------|-----------------|---------------|
| nviFP16 | SNVT_ppm | 300 to 5000 ppm | 65535 ppm     |

## nviChgOver (nviFP17)

This input is used to control the heat/cool operation when using 2 pipes change-over systems. When this variable is used, it has priority over nviSourceTemp and all locally connected inputs.

| State | Value    | ChangeOver Mode |
|-------|----------|-----------------|
| 0     | N/A      | Cool            |
| 1     | 0        | Cool            |
| 1     | 1 to 100 | Heat            |
| -1    | N/A      | Unused          |

| ID      | Units       | Default Value |
|---------|-------------|---------------|
| nviFP17 | SNVT_switch | 0% / -1       |

## nviDewPtSensor (nviFP18)

This input is used to receive a dew point sensor value.

When condensation occurs on cooling pipe, this network value can stop the cooling valve operation.

When this variable is used, it has priority over a locally connected input.

Upon return to normal of this network value, a delay is started before enabling the cooling valve.

This delay can be adjusted using DewPointSensorDelay (nciCn01\_07/ConstantNum5), the default value is 600 sec.

| State | Value    | Cooling Valve |
|-------|----------|---------------|
| 0     | N/A      | Enable        |
| 1     | 0        | Enable        |
| 1     | 1 to 100 | Disable       |
| -1    | N/A      | Enable        |

| ID      | Units       | Default Value |
|---------|-------------|---------------|
| nviFP18 | SNVT_switch | 0% / -1       |

## nviWindowContact (nviFP20)

This input is used to receive window contact status.

When connected to nvoWindowContact of slave controllers using Fan-In bindings, the master controller will automatically validate if a window is open in the zone.

The controller will then output this value using nvoEnergyHoldOff to be able to shutdown the slave units when a window is open. The locally connected window contact is processed in conjunction with nviWindowContact to calculate nvoEnergyHoldOff.

As soon as an Open value is received nvoEnergyHoldOff will be set to 1,100.

If no other Open value is received during the next 150 seconds, nvoEnergyHoldOff will be set to 0,0.

Therefore, the MaxSendTime of the nvoWindowContact network variable of the other controllers must be set to a value lower than 150 seconds to make sure that the controller will receive an update before the end of the timer.

| State | Value    | Window |
|-------|----------|--------|
| 0     | N/A      | Close  |
| 1     | 0        | Close  |
| 1     | 1 to 100 | Open   |
| -1    | N/A      | Close  |

| ID      | Units       | Default Value |
|---------|-------------|---------------|
| nviFP20 | SNVT_switch | 0% / -1       |

## nviShedding (nviFP21)

This input is used to receive shedding information from a supervisory node.

Two types of shedding are available for the HVAC equipment.

The first type is a direct shedding of the electric heater. The electric heater is rescaled between 0% and (100% - nviShedding). For example, if nviShedding = 40% and the electric heater demand is 65%, the electric heater will be set to 39% ( $65\% * (100\% - 40\%)$ ).

The second type of shedding is an offset of the occupied/unoccupied setpoints. The shedding will automatically calculate an offset based on the difference between the occupied and standby setpoints to apply to the effective setpoint.

For example, in Occupied mode:

- $\text{EffectCoolSp} = ((\text{StbyCoolSp} - \text{OccCoolSp}) * \text{nviShedding}/100) + \text{OccCoolSp}$
- $\text{EffectCoolSp} = ((26^{\circ}\text{C} - 24^{\circ}\text{C}) 30\% / 100) + 24^{\circ}\text{C} = 24.6^{\circ}\text{C}$
- $\text{EffectHeatSp} = ((\text{StbyHeatSp} - \text{OccHeatSp}) * \text{nviShedding}/100) + \text{OccHeatSp}$
- $\text{EffectHeatSp} = ((18^{\circ}\text{C} - 20^{\circ}\text{C}) 30\% / 100) + 20^{\circ}\text{C} = 19.4^{\circ}\text{C}$

For example, in Standby mode:

- $\text{EffectCoolSp} = ((\text{StbyCoolSp} - \text{OccCoolSp}) * \text{nviShedding}/100) + \text{OccCoolSp}$
- $\text{EffectCoolSp} = ((26^{\circ}\text{C} - 24^{\circ}\text{C}) 30\% / 100) + 26^{\circ}\text{C} = 26.6^{\circ}\text{C}$
- $\text{EffectHeatSp} = ((\text{StbyHeatSp} - \text{OccHeatSp}) * \text{nviShedding}/100) + \text{OccHeatSp}$
- $\text{EffectHeatSp} = ((18^{\circ}\text{C} - 20^{\circ}\text{C}) 30\% / 100) + 18^{\circ}\text{C} = 17.4^{\circ}\text{C}$

Shedding can be disabled using the variable nciMiscConfig/SheddingEnable (nviFP44).

To configure the system for shedding on setpoints, the variable nciMiscConfig/SheddingOnSetpoint (nviFP44) must be set to True.

It is also possible to do shedding on lighting outputs. See the variable nviLightBlndCnfg (nviFP42) for more information on this topic.

| ID      | Units                | Valid Range | Default Value |
|---------|----------------------|-------------|---------------|
| nviFP21 | SNVT_lev_percent (%) | 0 to 100%   | 163,835%      |

## nviUnitStatus (nviFP22)

This input is used to receive information from a supervisory node.

This variable is usually used to do master/slave direct control of outputs.

If this variable is used, all the outputs of the slave controller will be set to the values received by nviUnitStatus.

The actual outputs are linked to the following fields:

| Field                 | Description                         |
|-----------------------|-------------------------------------|
| Mode                  | Hvac mode                           |
| heat_output_primary   | Heating valve control               |
| heat_output_secondary | Electric heater control             |
| cool_output           | Cooling or changeOver valve control |
| econ_output           | Damper control                      |
| fan_output            | Fan control                         |
| inAlarm               | Not used                            |

| Field Name            | Min Value | Max Value | Default Value |
|-----------------------|-----------|-----------|---------------|
| Mode                  | 0         | 9         | NUL           |
| heat_output_primary   | 0%        | 100%      | 163,84%       |
| heat_output_secondary | 0%        | 100%      | 163,84%       |
| cool_output           | 0%        | 100%      | 163,84%       |
| econ_output           | 0%        | 100%      | 163,84%       |
| fan_output            | 0%        | 100%      | 163,84%       |
| inAlarm               | 0         | 255       | 255           |

| ID      | Units            | Default Value |
|---------|------------------|---------------|
| nviFP22 | SNVT_hvac_status | N/A           |

## nviSlaveInfo (nviFP23)

This input is used to receive information from a slave controller.

The different information received from the slave controller will be processed by the master controller to calculate the different operating mode and functions of the master controller.

In a master/slave scenario, this variable will be bound to nvoSlaveInfo of a slave controller.

This variable can be used in a Fan-In binding configuration, some values are averaged and others are processed in a last valid configuration. The nvoSlaveInfo of the master controller must be bound to its own nviSlaveInfo to ensure that the information is processed in the calculation.

This variable has priority over the locally connected inputs.

| Field                | Description                                                                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SpaceTemp            | Not used                                                                                                                                                   |
| SetpointOffset       | Affect nvoSetptOffset when SetpointOffsetUpdate is true.                                                                                                   |
| FanSpeedCmd          | Affect nvoFanSpeedCmd when FanSpeedCmdUpdate is true.                                                                                                      |
| LightLevel           | The controller will average the values received on this variable and will not process the ReflexFactor.                                                    |
| Occupancy:           | Change or reset the room occupancy when OccupancyUpdate is true.                                                                                           |
| Motion               | Affect the motion detection of the zone.                                                                                                                   |
| Window               | Window contact information, 0 = Close; 1 = Open. The controller will process these with nviWindowContact and affect nvoEnergyHoldOff using Fan-In Bindings |
| SetpointOffsetUpdate | Must be true for SetpointOffset to be processed.                                                                                                           |
| FanSpeedCmdUpdate    | Must be true for FanSpeedCmd to be processed.                                                                                                              |
| OccupancyUpdate      | Must be true for Occupancy to be processed                                                                                                                 |
| Group1               | Indicate an update of the EC-Remote remote control group commands                                                                                          |
| Group2               | EC-Remote remote control group commands (Light/Blind/)                                                                                                     |

## Variables

| Field Name           | Min Value | Max Value             | Default Value |
|----------------------|-----------|-----------------------|---------------|
| SpaceTemp            | -10°C     | 50°C                  | 327.67°C      |
| SetpointOffset       | -10°C     | 10°C                  | 0°C           |
| FanSpeedCmd          | 0%        | 100%                  | 0%            |
| LightLevel           | 0         | 65534                 | 65535         |
| Occupancy            | -1        | 1                     | -1            |
| Motion               | -1        | 1                     | -1            |
| Window               | 0         | 1                     | 0             |
| Alarm                | 0         | 1                     | 0             |
| SetpointOffsetUpdate | 0         | 1                     | 0             |
| FanSpeedCmdUpdate    | 0         | 1                     | 0             |
| OccupancyUpdate      | 0         | 1                     | 0             |
| GroupUpdate          | 0         | 1                     | 0             |
| Reserved1            | 0         | 1                     | 0             |
| Reserved2            | 0         | 1                     | 0             |
| Group1               | 0 (Off)   | 6 (Sunblind Rot Down) | -1 (null)     |
| Group2               | 0 (Off)   | 6 (Sunblind Rot Down) | -1 (null)     |
| Group3               | 0 (Off)   | 6 (Sunblind Rot Down) | -1 (null)     |
| Group4               | 0 (Off)   | 6 (Sunblind Rot Down) | -1 (null)     |
| Group5               | 0 (Off)   | 6 (Sunblind Rot Down) | -1 (null)     |
| Group6               | 0 (Off)   | 6 (Sunblind Rot Down) | -1 (null)     |
| Group7               | 0 (Off)   | 6 (Sunblind Rot Down) | -1 (null)     |
| Group8               | 0 (Off)   | 6 (Sunblind Rot Down) | -1 (null)     |

| ID      | Units          | Default Value |
|---------|----------------|---------------|
| nviFP23 | UNVT_Slaveinfo | N/A           |

## nciSpaceCO2Lim (nviFP37)

This configuration property defines a high limit CO2 setpoint for the controlled space. This setpoint will be used to control the air quality damper if nviOutdoorCO2 is not used.

| ID      | Units    | Valid Range     | Default Value |
|---------|----------|-----------------|---------------|
| nviFP37 | SNVT_ppm | 300 to 5000 ppm | 1000 ppm      |



## nciFanSettings (nviFP39)

This configuration property defines the different available fan configurations.

| Field            | Description                                                                                                                                                                                                                                                                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FanCtrlType      | This configuration is used to choose the fan control type (Variable, 3Speed, 2Speed, 1 Speed or None)                                                                                                                                                                                                                                                                     |
| FanMode          | This configuration is used to configure the behavior of the fan.<br>Continuous = Fan continuously operating<br>Cycle = Fan cycling based on cooling/heating load<br>Con Cycle = Fan continuously operating in occupied mode and cycling in unoccupied mode.<br>Cycle Heat = Fan cycling based on heating load only<br>Cycle Cool = Fan cycling based on cooling load only |
| CoolMaxFanSpeed  | This configuration is used to set the maximum fan speed in cooling mode.                                                                                                                                                                                                                                                                                                  |
| HeatMaxFanSpeed  | This configuration is used to set the maximum fan speed in heating mode.                                                                                                                                                                                                                                                                                                  |
| FanOffDelay      | This configuration is used to set the Fan Off delay. On a request to stop the fan, the fan will run at minimum speed during this delay before being completely stopped. During that time, heating/cooling operation is disabled.                                                                                                                                          |
| FanSpeed1Level   | This configuration is used to configure the load (heating/cooling) required to start the fan when in Cycle mode configuration. This is also the fan speed at which the fan will be set when the system is overridden to low speed and nviFanSpeedCmdDigital (nciCb01_124/ConstantBool3) is set to TRUE.                                                                   |
| FanSpeed2Level   | This configuration is used to configure the fan speed at which the fan will be set when the system is overridden to medium speed and nviFanSpeedCmdDigital (nciCb01_124/ConstantBool3) is set to TRUE.                                                                                                                                                                    |
| FanSpeed3Level   | This configuration is used to configure the fan speed at which the fan will be set when the system is overridden to high speed and nviFanSpeedCmdDigital (nciCb01_124/ConstantBool3) is set to TRUE.                                                                                                                                                                      |
| VarSpeedMinLevel | This configuration is used to set the minimum fan speed operation.                                                                                                                                                                                                                                                                                                        |
| FanCoolLow       | This configuration is used to set the minimum cooling load required to start the fan operation algorithm                                                                                                                                                                                                                                                                  |
| FanCoolHigh      | This configuration is used to set the cooling load at which the fan will be set to CoolMaxFanSpeed.                                                                                                                                                                                                                                                                       |
| FanHeatLow       | This configuration is used to set the minimum heating load required to start the fan operation algorithm                                                                                                                                                                                                                                                                  |
| FanHeatHigh      | This configuration is used to set the heating load at which the fan will be set to HeatMaxFanSpeed.                                                                                                                                                                                                                                                                       |

| Field            | Min Value    | Max Value      | Default Value   |
|------------------|--------------|----------------|-----------------|
| FanCtrlType      | -1 (Mem Nul) | 4 (VaFanSpeed) | 4 (VarFanSpeed) |
| FanMode          | 1 (Nul)      | 4 (Cycle Cool) | 0 (Continuous)  |
| CoolMaxFanSpeed  | 0%           | 100%           | 100%            |
| HeatMaxFanSpeed  | 0%           | 100%           | 100%            |
| FanOffDelay      | 0s           | 6553.5s        | 120s            |
| FanSpeed1Level   | 0%           | 100%           | 5%              |
| FanSpeed2Level   | 0%           | 100%           | 31%             |
| FanSpeed3Level   | 0%           | 100%           | 67%             |
| VarSpeedMinLevel | 0%           | 100%           | 10%             |
| FanCoolLow       | 0%           | 100%           | 0%              |
| FanCoolHigh      | 0%           | 100%           | 100%            |
| FanHeatLow       | 0%           | 100%           | 0%              |

| ID      | Units             | Default Value |
|---------|-------------------|---------------|
| nviFP39 | UNVT_fan_settings | N/A           |

See IO assignment section for more details.

## nciDamperSettings (nviFP40)

This configuration property defines the different configuration of the air quality damper.

| Field            | Description                                                                                          |
|------------------|------------------------------------------------------------------------------------------------------|
| outdoorCO2Offset | This configuration is used to calculate the effective Space CO2 setpoint when nviOutdoorCO2 is used. |
| minPositionOcc   | This configuration is used to set the minimum damper position in occupied mode.                      |
| minPositionStby  | This configuration is used to set the minimum damper position in standby mode.                       |
| maxPosition      | This configuration is used to set the maximum allowable damper position.                             |
| Reserved1        | This configuration is not used in this program.                                                      |
| Reserved2        | This configuration is not used in this program.                                                      |

| Field Name       | Min Value | Max Value | Default Value |
|------------------|-----------|-----------|---------------|
| outdoorCO2Offset | 100 ppm   | 2000 ppm  | 600 ppm       |
| minPositionOcc   | 0%        | 100%      | 10%           |
| minPositionStby  | 0%        | 100%      | 5%            |
| maxPosition      | 0%        | 100%      | 100%          |
| Reserved1        | 0%        | 100%      | 0%            |
| Reserved2        | 0%        | 100%      | 0%            |

| ID      | Units                | Default Value |
|---------|----------------------|---------------|
| nviFP40 | UNVT_Damper_settings | N/A           |

## nciHVACScaling (nviFP41)

This configuration property can be used to rescale the heating cooling load of the different equipments.

| Field           | Description                                                                                                         |
|-----------------|---------------------------------------------------------------------------------------------------------------------|
| minCoolingValve | This configuration is used to select the cooling load value before starting the cooling valve operation.            |
| maxCoolingValve | This configuration is used to select the cooling load value at which the cooling valve will be at 100% operation.   |
| minHeatingValve | This configuration is used to select the heating load value before starting the heating valve operation.            |
| maxHeatingValve | This configuration is used to select the heating load value at which the heating valve will be at 100% operation.   |
| minElectHeater  | This configuration is used to select the heating load value before starting the electric heater operation.          |
| maxElectHeater  | This configuration is used to select the heating load value at which the electric heater will be at 100% operation. |

| Field Name    | Min Value     | Min Value     | Default Value |
|---------------|---------------|---------------|---------------|
| Default Value | Default Value | Default Value | Default Value |
| Default Value | Default Value | Default Value | Default Value |
| Default Value | Default Value | Default Value | Default Value |
| Default Value | Default Value | Default Value | Default Value |
| Default Value | Default Value | Default Value | Default Value |
| Default Value | Default Value | Default Value | Default Value |

| ID      | Units             | Default Value |
|---------|-------------------|---------------|
| nviFP41 | UNVT_hvac_scaling | N/A           |

## nciMiscConfig (nviFP44)

This configuration property defines miscellaneous configurations for the HVAC control functions.

| Field              | Description                                                                   |
|--------------------|-------------------------------------------------------------------------------|
| SI3Config          | This configuration is used to configure sensor type link to SI3 input.        |
| SpOffsetLimit      | Setpoint Offset Limit for EC-Remote remote control and EC-Smart-Vue           |
| SpaceTempOffset    | Space Temperature Calibration Offset                                          |
| DischTempOffset    | Discharge Temperature Calibration Offset                                      |
| ReturnTempOffset   | Return Temperature Calibration Offset                                         |
| MinDischAirSP      | Minimum Discharge Temperature Setpoint Limitation                             |
| MaxDischAirSP      | Maximum Discharge Temperature Setpoint Limitation                             |
| FrostProtSp        | Frost Protection Setpoint                                                     |
| DischAirLimitType  | Discharge temperature limitation type                                         |
| ChgOverDelay       | Change Over Delay between Heat/Cool Mode                                      |
| MotionHoldTime     | Motion Hold Time Delay (Delay is divided by 3 when BMS is in Unoccupied Mode) |
| BypassTime         | Bypass Time from Occupany Push Button or EC-Smart-Vue                         |
| Sensor1Zone        | EC-Multi-Sensor #1 Infrared Zone Number                                       |
| Sensor2Zone        | Unused                                                                        |
| SheddingOnSetpoint | Enable Shedding via Setpoints Offset or via direct load shedding              |
| SheddingEnabled    | Enable Shedding Commands for HVAC equipment                                   |

| Field              | Min Value     | Max Value | Default Value  |
|--------------------|---------------|-----------|----------------|
| SI3Config          | 0 (SpaceTemp) | 4 (Other) | 0              |
| SpOffsetLimit      | 0°C           | 10°C      | 3°C            |
| SpaceTempOffset    | -10°C         | 10°C      | 0°C            |
| DischTempOffset    | -10°C         | 10°C      | 0°C            |
| ReturnTempOffset   | -10°C         | 10°C      | 0°C            |
| MinDischAirSP      | 5 °C          | 20 °C     | 13°C           |
| MaxDischAirSP      | 20 °C         | 45 °C     | 35°C           |
| FrostProtSp        | 2 °C          | 15 °C     | 8 °C           |
| DischAirLimitType  | 0             | 3         | 0(Not Limited) |
| ChgOverDelay       | 0 min         | 30 min    | 1 min          |
| MotionHoldTime     | 1 min         | 120 min   | 15 min         |
| BypassTime         | 0 min         | 360 min   | 60 min         |
| Sensor1Zone        | 0             | 30        | 0              |
| Sensor2Zone        | 0             | 30        | 0              |
| SheddingOnSetpoint | 0             | 1         | 0              |
| SheddingEnabled    | 0             | 1         | 1              |
| Reserved1          | 0             | 1         | 1              |
| Reserved2          | 0             | 1         | 0              |
| Reserved3          | 0             | 1         | 0              |
| Reserved4          | 0             | 1         | 0              |
| Reserved5          | 0             | 1         | 0              |
| Reserved6          | 0             | 1         | 0              |

| ID      | Units                | Default Value |
|---------|----------------------|---------------|
| nviFP44 | UNVT_Misc_Config_PTU | N/A           |

## nciComSensorConfig (nviFP45)

This configuration property can be used to rescale the heating cooling load of the different equipments.

| Field              | Description                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------------------|
| MinCoolSP          | Unused                                                                                                  |
| MaxCoolSP          | Unused                                                                                                  |
| MinHeatSP          | Unused                                                                                                  |
| MaxHeatSP          | Unused                                                                                                  |
| ComSensorSpType    | unused                                                                                                  |
| ComSensorDisplay   | Defines the value to be displayed by the EC-Smart-Vue (SpaceTemp, MidSetpoint, SetPtOffset, EffectSp)   |
| ComSensor1Lock     | Defines the available menus level on the EC-Smart-Vue (Full Access, Sp & Overrides, Sp Only, No Access) |
| ComSensor2Lock     | Unused                                                                                                  |
| ComSensor1DegF     | Unused                                                                                                  |
| ComSensor2DegF     | Unused                                                                                                  |
| DisplaySpaceCO2    | Used to enable the display of the space CO2 concentration on the EC-Smart-Vue rolling display           |
| DisplayOutdoorTemp | Unused                                                                                                  |
| DisplaySpaceRH     | Used to enable the display of the space air humidity on the EC-Smart-Vue rolling display                |
| Reserved1          | Unused                                                                                                  |
| Reserved2          | Unused                                                                                                  |
| Reserved3          | Unused                                                                                                  |

| Field Name         | Field Name     | Max Value      | Max Value      |
|--------------------|----------------|----------------|----------------|
| MinCoolSP          | 15.5°C         | 32.5°C         | 20°C           |
| MaxCoolSP          | 15.5°C         | 32.5°C         | 26°C           |
| MinHeatSP          | 12.5°C         | 29.5°C         | 16°C           |
| MaxHeatSP          | 12.5°C         | 29.5°C         | 22°C           |
| ComSensorSpType    | 0(coolheatsp)  | 2(midsetpoint) | 1(spoffset)    |
| ComSensorDisplay   | 0(spacetemp)   | 3(effectsp)    | 0(spacetemp)   |
| ComSensor1Lock     | 0(Full Access) | 3(No Access)   | 0(Full Access) |
| ComSensor2Lock     | 0(Full Access) | 3(No Access)   | 0(Full Access) |
| ComSensor1DegF     | 0              | 1              | 0              |
| ComSensor2DegF     | 0              | 1              | 0              |
| DisplaySpaceCO2    | 0              | 1              | 0              |
| DisplayOutdoorTemp | 0              | 1              | 0              |
| DisplaySpaceRH     | 0              | 1              | 0              |
| Reserved1          | 0              | 1              | 1              |
| Reserved2          | 0              | 1              | 1              |
| Reserved3          | 0              | 1              | 0              |

| ID      | Units                      | Default Value |
|---------|----------------------------|---------------|
| nviFP45 | UNVT_comsensor_1to2_config | N/A           |

## nviSchedule\_1

This input network variable is used to command the Space Comfort Controller into different occupancy modes. It is typically sent by a scheduler or supervisory node.

This network variable input overrides the internal scheduler, if this input is not bound, the internal scheduler will be used in the controller configuration.

SNVT\_tod\_event is a structure containing three parts. The first part, current\_state, is required for this network variable input. The additional parts, next\_state and time\_to\_next\_state, are optional. They can be used for control strategies that provide improved transitions between states.

A scheduler node should send OC\_NUL and 0, respectively, if it does not use these functions.

The controller node will ignore these values if the functions are not supported by the controller.

This input is used in conjunction with nviOccManCmd and nviOccSensor (if installed) to determine the effective occupancy mode. Refer to Effective Occupancy Output (nvoEffectOccup) for more information.

| ID            | Units                                                                                                                                                                                                                                                                                                                                                                                                         | Default Value |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| nviSchedule_1 | SNVT_tod_event<br>0 = OC_OCCUPIED: The Space Comfort Controller should operate in the occupied mode<br>1 = OC_UNOCCUPIED: The Space Comfort Controller should operate in the unoccupied mode<br>3 = OC_STANDBY: The Space Comfort Controller should operate in the standby mode<br>0xFF = OC_NUL: It is used to indicate that this network variable input is invalid or unused.<br>for next_state: (optional) | OC_OCCUPIED   |

## Network Variables Output

### nvoSpaceTemp

This output network variable is used to monitor the effective space temperature that the Space Comfort Controller is using for control.

If the input nviSpaceTempAvg has a valid value, this output will be equal to the average of all values received by nviSpaceTempAvg.

If the input nviSpaceTemp has a valid value and nviSpaceTempAvg is not valid, this output will echo the value of the input.

If a valid value for nviSpaceTemp does not exist, the locally wired sensor value is used.

If neither value is available, the output will send the invalid value.

The locally wired sensor priority order is the following:

- ☐ SI3 Space Temperature
- ☐ EC-Smart-View temperature
- ☐ EC-Smart-Comfort temperature
- ☐ EC-Remote Space Temperature
- ☐ SI3 Return Temperature
- ☐ EC-Multi-Sensor Temperature

| ID           | Units       | Valid Range | Default Value |
|--------------|-------------|-------------|---------------|
| nvoSpaceTemp | SNVT_temp_p | N/A         | N/A           |

### nvoUnitStatus

This output network variable is available to report the Space Comfort Controller status.

It combines the operating mode, the capacity of heating and cooling used and an indication if any alarms are present in the object. SNVT\_hvac\_status allows this information to be provided in one network variable.

Refer to Effective Heat/Cool Output novHeatCool for additional information regarding the value reported in the mode field.

The outputs are linked to the following fields:

| Field                 | Description                                                                                                                                                                                                                                                                                                                                               |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mode                  | nvoHeatCool                                                                                                                                                                                                                                                                                                                                               |
| heat_output_primary   | heating valve control                                                                                                                                                                                                                                                                                                                                     |
| heat_output_secondary | electric heater control                                                                                                                                                                                                                                                                                                                                   |
| cool_output           | cooling or change-over valve control                                                                                                                                                                                                                                                                                                                      |
| econ_ouput            | Damper control                                                                                                                                                                                                                                                                                                                                            |
| fan_output            | Fan control                                                                                                                                                                                                                                                                                                                                               |
| inAlarm               | <p>This input manage 7 digital alarms :</p> <p>(1) : SpaceTempFault</p> <p>(2) : Light Extension 1 offline</p> <p>(4) : Light Extension 2 offline</p> <p>(8) : Blind Extension 1 offline</p> <p>(16) : Blind extension 2 offline</p> <p>(32) : MultiSensor offline</p> <p>(64) : EC-Smart-vue offline</p> <p>(128) : additional digital alarm in gfx.</p> |

| ID            | Units            | Valid Range | Default Value |
|---------------|------------------|-------------|---------------|
| nvoUnitStatus | SNVT_hvac_status | N/A         | N/A           |

## nvoEffectSetpt (nvoFP01)

This output network variable is used to monitor the effective temperature setpoint that may depend on nciSetpoints, nvoEffectOccup, nviSetpoint, nviSetpointOffset, nviHeatCool, and any local setpoint adjustment.

For example, if the occupancy state is unoccupied and the heat/cool state is heat, then the effective setpoint would be equal to the unoccupied heating setpoint defined in nciSetpoints.

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP01 | SNVT_temp_p | N/A         | N/A           |

## nvoEffectOccup (nvoFP02)

This output network variable is used to indicate the actual occupancy mode of the unit.

This information is typically reported to a supervisory controller, or provided to another Space Comfort Controller to coordinate the operation of multiple units.

The occupancy mode is determined by a combination of optional input network variables and logic in the controller. See Occupancy Control section for more information.

| ID      | Units          | Valid Range | Default Value |
|---------|----------------|-------------|---------------|
| nvoFP02 | SNVT_occupancy | N/A         | N/A           |

## nvoHeatCool (nvoFP03)

This output network variable is used to indicate the actual heat/cool mode of the unit.

This information is typically reported to a supervisory controller, or provided to another Space Comfort Controller to coordinate the operation of multiple units.

When nviApplicMode is equal to AUTO or NUL, nvoHeatCool mode is set by the controller based on the heating/cooling demand.

When nviApplicMode is not equal to AUTO or NUL, nvoHeatCool is equal to nviApplicMode.

When the space temperature is below the frost protection setpoint, nvoHeatCool is equal to HVAC\_EMERG\_HEAT.

| ID      | Units          | Valid Range | Default Value |
|---------|----------------|-------------|---------------|
| nvoFP03 | SNVT_hvac_mode | N/A         | N/A           |

## nvoFanSpeed (nvoFP04)

This output network variable reflects the actual fan speed control command.

See Fan Control Section for more information.

| Fan Status          | State | Value |
|---------------------|-------|-------|
| Off                 | 0     | n/a   |
| Between 1% and 100% | 1     | >0%   |

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP04 | SNVT_switch | N/A         | N/A           |

## nvoDischargeAirTemp (nvoFP05)

This output network variable is used to display the actual discharge air temperature sensor value.

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP05 | SNVT_temp_p | N/A         | N/A           |

## nvoTerminalLoad (nvoFP06)

This output indicates the current heat/cool energy demand of the unit.

Positive values indicate that cooling energy is required (or in use) by the space comfort controller, while negative values indicate that heating energy is required (or in use) by the space comfort controller.

This reports the output of the heating/cooling control algorithm.

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nvoFP06 | SNVT_lev_percent | N/A         | N/A           |

## nvoSpaceRH (nvoFP07)

This output network variable indicates the space humidity in percent, if the Space Comfort Controller Device has an Allure EC-Smart-View sensor with humidity. If not used, this variable output is 163.835%

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nvoFP07 | SNVT_lev_percent | N/A         | N/A           |

## nvoSpaceCO2 (nvoFP09)

This output network variable indicates the space CO2 concentration in ppm, if the Space Comfort Controller Device has a locally wired CO2 sensor.

If a valid value is received by nviSpaceCO2, this value has priority over the local input or the Allure EC-Smart-View sensor with CO2 sensor.

If not used, this variable output is 65535 ppm.

| ID      | Units    | Valid Range | Default Value |
|---------|----------|-------------|---------------|
| nvoFP09 | SNVT_ppm | N/A         | N/A           |

## nvoEnergyHoldOff (nvoFP10)

This output indicates the actual Energy Hold Off state of the device.

If the variable nviWindowContact is connected, the Energy Hold Off will be set to 1,100 if a window is open within the zone.

The hard-wired window contact input will also affect this variable.

| ID      | Units     | Valid Range | Default Value |
|---------|-----------|-------------|---------------|
| nvoFP10 | SNVT_swth | N/A         | N/A           |

## nvoLocalSpaceTemp (nvoFP11)

This output network variable provides the value of a local hardwired space temperature input.

This is useful for averaging several controllers' data together when controlling a large space.

Refer to nviSpaceTempAvg for information on how to average multiple controllers together.

This output value will output one of the following using this priority order:

- ☐ SI3 Space Temperature
- ☐ EC-Smart-View temperature
- ☐ EC-Remote Space Temperature
- ☐ SI3 Return Temperature
- ☐ EC-Multi-Sensor Temperature

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP11 | SNVT_temp_p | N/A         | N/A           |



## nvoReturnTemp (nvoFP12)

This output network variable is used to monitor the temperature of the air that enters the Space Comfort Controller, if the input SI3 is linked to the return air temperature custom block. If not used, this variable output is 327.67°C.

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP12 | SNVT_temp_p | N/A         | N/A           |

## nvoFanSpeedCmd (nvoFP13)

This output network variable will output the actual fan speed command override of the unit.

When nviFanSpeedCmd is valid (State between 0 and 1), nvoFanSpeedCmd equals nviFanSpeedCmd. Otherwise, nvoFanSpeedCmd is linked with the local fan speed override of the EC-Remote, the EC-Smart-View or the EC-Smart-Comfort.

| Fan Override | State | Value  |
|--------------|-------|--------|
| Auto         | -1    | n/a    |
| Off          | 0     | n/a    |
| Low          | 1     | 33%    |
| Med          | 1     | 66.50% |
| High         | 1     | 100%   |

| Fan Override | State | Value | Fan Override |
|--------------|-------|-------|--------------|
| Auto         | -1    | n/a   | Auto         |

## nvoSourceTemp (nvoFP14)

This output network variable is used to monitor the temperature of the source temperature.

If nviSourceTemp is valid, nvoSourceTemp will use this value.

If nviSourceTemp is invalid, nvoSourceTemp will be equal to a local input, if configured.

If not used, this variable output is 327.67°C.

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP14 | SNVT_temp_p | N/A         | N/A           |

## nvoEffectCoolSp (nvoFP15)

This output network variable is used to monitor the effective cooling setpoint.

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP15 | SNVT_temp_p | N/A         | N/A           |

## nvoEffectHeatSp (nvoFP16)

This output network variable is used to monitor the effective heating setpoint.

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP16 | SNVT_temp_p | N/A         | N/A           |

## nvoEffectHeatSp (nvoFP16)

This output network variable is used to monitor the effective heating setpoint.

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP16 | SNVT_temp_p | N/A         | N/A           |

## nvoSetPtOffset (nvoFP17)

This output network variable is used to monitor the effective setpoint offset used by the controller. The calculation of the effective setpoint offset is done using the following priority order:

- ☐ nviSetPtOffset
- ☐ Last value received via nviSlaveInfo/SetpointOffset
- ☐ Value received via EC-Multi-Sensor, Allure EC-Smart-Vue or EC-Smart-Comfort
- ☐ Hard wired input

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP17 | SNVT_temp_p | N/A         | N/A           |

## nvoTempErr (nvoFP18)

This output network variable is used to monitor the temperature deviation from setpoint. This variable is equal to the cooling temperature deviation plus the heating temperature deviation.

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nvoFP18 | SNVT_temp_diff_p | N/A         | N/A           |

## nvoCO2Load (nvoFP19)

This output network variable is used to monitor the actual fresh air request based on the CO2 concentration.

| ID      | Units            | Valid Range | Default Value |
|---------|------------------|-------------|---------------|
| nvoFP19 | SNVT_lev_percent | N/A         | N/A           |

## nvoPresence (nvoFP20)

This output network variable is used to monitor the actual presence detection used by the controller.

If a valid value is received via nviOccSensor, this value will be used.

If a motion valid value is received via nviSlaveInfo, this value will be used as a 2nd priority.

The last priority is the Allure EC-Smart-Vue sensor and/or the EC-Multi-Sensor in parallel.

This network variable uses the HoldTime for detection.

| ID      | Units          | Valid Range | Default Value |
|---------|----------------|-------------|---------------|
| nvoFP20 | SNVT_occupancy | N/A         | N/A           |

## nvoChgOver (nvoFP21)

This output network variable is used to monitor the actual change over status used by the controller.

The changeover status is calculated using the following priority order:

- ☐ Valid value received by nviChgOver
- ☐ Valid value received by nviSourceTemp (a calculation is then made to switch the mode between heat/cool based on the source temperature). The change over is switch between heating and cooling based on ChgOverCoolOn(NumericConstant16) and ChgOverCoolOff(NumericConstant17)

If none of these are valid, nvoChgOver is by default set to Heat and will output -1.0.

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP21 | SNVT_switch | N/A         | N/A           |

## nvoDewPointSensor (nvoFP22)

This output network variable is used to monitor the actual dew point sensor status used by the controller.

The dewpoint status is calculated using the following priority order:

- ☐ Valid value received by nviDewPtSensor
- ☐ Hardware input configured for dew point sensor (Digital Input)

If none of these are valid, nvoDewPtSensor is by default set to Enable and will output -1.0.

| State | Value | Cooling Valve |
|-------|-------|---------------|
| 0     | n/a   | Enable        |
| 1     | 0     | Disable       |
| 1     | >0    | Disable       |
| 0xFF  | n/a   | Enable        |

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP22 | SNVT_switch | N/A         | N/A           |

## nvoWindowContct (nvoFP24)

This output network variable is used to monitor the window contact status of the space comfort controller.

| State | Value | Window Contact |
|-------|-------|----------------|
| 0     | n/a   | Close          |
| 1     | 0     | Close          |
| 1     | > 0   | Open           |
| 0xFF  | n/a   | Close          |

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP24 | SNVT_switch | N/A         | N/A           |

## nvoAuxContact (nvoFP25)

This output network variable is used to monitor the status of an auxiliary contact wired to the space comfort controller.

| State          | Value          | Contact Status |
|----------------|----------------|----------------|
| Contact Status | Contact Status | Contact Status |
| Contact Status | Contact Status | Contact Status |
| Contact Status | Contact Status | Contact Status |
| Contact Status | Contact Status | Contact Status |

| ID      | Units       | Valid Range | Default Value |
|---------|-------------|-------------|---------------|
| nvoFP25 | SNVT_switch | N/A         | N/A           |

## nvoEcoVue (nvoFP26)

This output network variable can be used to display the actual ECO-Vue of the unit. This variable is not used in this program.

| ID      | Units                 | Valid Range | Default Value |
|---------|-----------------------|-------------|---------------|
| nvoFP26 | SNVT_energy_efficient | N/A         | N/A           |

## nvoSlaveInfo (nvoFP27)

This output is used to send information from a slave controller.

The different information received from the slave controller will be processed by the master controller to calculate the different operating mode and functions of the master controller.

In a master/slave scenario, this variable will be bound to nviSlaveInfo of the master controller.

The nvoSlaveInfo of the master controller must be bound to its own nviSlaveInfo to make sure that the information is processed in the calculation.

| Field                | Description                                                            |
|----------------------|------------------------------------------------------------------------|
| SpaceTemp            | Local Space Temperature                                                |
| SetpointOffset       | Local Setpoint Offset                                                  |
| FanSpeedCmd          | Local Fan Speed Command                                                |
| LightLevel           | Local light level of EC-Multi-Sensor with nciLightLoopCfg/ReflexFactor |
| Occupancy            | Local Occupancy from EC-Remote                                         |
| Motion               | Local Motion detection                                                 |
| Window               | Local Window Contact Information                                       |
| SetpointOffsetUpdate | Local Setpoint Offset Update                                           |
| FanSpeedCmdUpdate    | Local Fan Speed Command Update processed.                              |
| OccupanyUpdate       | Local Occupancy Update                                                 |
| GroupUpdate          | Local EC-Remote Group Command Update                                   |
| Group1-8             | EC-Remote remote control group commands (Light/Blind/)                 |

| ID      | Units          | Valid Range | Default Value |
|---------|----------------|-------------|---------------|
| nvoFP27 | SNVT_SlaveInfo | N/A         | N/A           |

## Boolean Constants

### FreeCoolingEnable (ConstantBool1)

This variable is used to enable free cooling via the fresh air damper.

| ID                 | Units      | Valid Range | Default Value |
|--------------------|------------|-------------|---------------|
| Constant Boolean 1 | TRUE/FALSE | N/A         | FALSE         |

### EnableRoomUnocc (ConstantBool2)

This variable is used to configure the behavior of RoomOccupancy when the OccupancyCmd is set to unoccupied.

When this variable is set to TRUE, the RoomOccupancy (BV2), will be set to Unoccupied on the reception of an unoccupied command from nviSchedule\_1.

| ID                 | Units     | Valid Range | Default Value |
|--------------------|-----------|-------------|---------------|
| Constant Boolean 2 | TRUE/FLSE | N/A         | TRUE          |

### nviFanSpeedCmdDigital (ConstantBool3)

This variable is used to configure the behavior of the fan speed signal when receiving fan speed command override from nviFanSpeedCmd.

When this value is set to TRUE, the value received from nviFanSpeedCmd will be considered 3 fan speed operation commands.

See nviFanSpeedCmd for more information on this configuration parameter.

| ID                 | Units      | Valid Range | Default Value |
|--------------------|------------|-------------|---------------|
| Constant Boolean 3 | TRUE/FALSE | N/A         | TRUE          |

### HeatValveConfig (ConstantBool4)

This variable is used to configure the operating mode of the heating valve.

| ID                 | Units             | Valid Range | Default Value     |
|--------------------|-------------------|-------------|-------------------|
| Constant Boolean 4 | NormOpen/NomClose | N/A         | NormClose (FALSE) |

### CoolValveConfig (ConstantBool5)

This variable is used to configure the operating mode of the cooling or change-over valve

| ID                 | Units             | Valid Range | Default Value     |
|--------------------|-------------------|-------------|-------------------|
| Constant Boolean 5 | NormOpen/NomClose | N/A         | NormClose (FALSE) |

## Numeric Constants

### Elevation (ConstantNum1)

This constant must be set for any elevation above 500ft (152m) to obtain the highest elevation compensation accuracy for the EC-Smart-Vue CO2 and the EC-Smart-Comfort reading; the sensor will automatically compensate CO<sub>2</sub> readings for a number of factors including the current room temperature and the elevation.

| ID                 | Units  | Valid Range | Default Value |
|--------------------|--------|-------------|---------------|
| Constant Numeric 1 | meters | N/A         | 0 m           |

### RangeCO2 (ConstantNum2)

This variable is used to configure the range of the CO2 sensor connected to UI1.

| ID                 | Units | Valid Range | Default Value |
|--------------------|-------|-------------|---------------|
| Constant Numeric 2 | ppm   | N/A         | 0 ppm         |

### UnoccOccDelay (ConstantNum3)

This variable is used to configure the delay required to change the nvoEffecOccup from unoccupied to occupied when motion is detected while an unoccupied mode is received from nviSchedule\_1.

The variable is used to prevent the HVAC system to be set to occupied when someone is detected during a short delay while in unoccupied mode. Lights and sunblinds are not affected by this delay.

| ID                 | Units   | Valid Range | Default Value |
|--------------------|---------|-------------|---------------|
| Constant Numeric 3 | seconds | N/A         | 600 seconds   |

### DamperMinPosUnocc (ConstantNum4)e

This variable is used to configure the dampers minimum position while in unoccupied mode.

| ID                 | Units       | Valid Range | Default Value |
|--------------------|-------------|-------------|---------------|
| Constant Numeric 4 | Percent (%) | 0 to 100%   | 0 %           |

### DewPointSensorDelay (ConstantNum5)

This variable is used to configure the delay after the return to normal of the dew point sensor before enabling the cooling operation of the unit.

| ID                 | Units   | Valid Range | Default Value |
|--------------------|---------|-------------|---------------|
| Constant Numeric 5 | seconds | N/A         | 600 seconds   |

### ElectricHeatPeriod (ConstantNum6)

This variable is used to configure the electric heater pwm period.

| ID                 | Units   | Valid Range       | Default Value |
|--------------------|---------|-------------------|---------------|
| Constant Numeric 6 | seconds | 60 to 300 seconds | 240 seconds   |

### FloatingDriveTime (ConstantNum7)

This variable is used to configure the drive time of the floating valve when either CoolValveType (ConstantEnum7) or HeatValveType (ConstantEnum8) is set to Floating.

| ID                 | Units   | Valid Range | Default Value |
|--------------------|---------|-------------|---------------|
| Constant Numeric 7 | seconds | N/A         | 95 seconds    |

## SensorSleepTime (ConstantNum8)

This variable is used to configure the sensor sleep time of the EC-Smart-Comfort sensor. If set to 0, the sensor sleep time is disabled

| ID                 | Units   | Valid Range | Default Value |
|--------------------|---------|-------------|---------------|
| Constant Numeric 8 | seconds | N/A         | 0 second      |

## SlaveTempDelta (ConstantNum14)

This variable is used to configure the minimum temperature variation before updating the nvoSlave-Info.SpaceTemp value.

| ID                  | Units                | Valid Range | Default Value |
|---------------------|----------------------|-------------|---------------|
| Constant Numeric 14 | Degrees-celsius (°C) | N/A         | 0,1 °C        |

## SlaveDelayMotion (ConstantNum15)

This variable is used to configure the motion stop delay before updating the nvoSlaveInfo.Motion value

| ID                  | Units   | Valid Range | Default Value |
|---------------------|---------|-------------|---------------|
| Constant Numeric 15 | seconds | N/A         | 10 seconds    |

## ChangeOverCoolOn (ConstantNum16)

This variable is used to configure the water temperature below which 2 pipes change-over systems are considered to be in cooling mode.

| ID                  | Units                | Valid Range | Default Value |
|---------------------|----------------------|-------------|---------------|
| Constant Numeric 16 | Degrees-celsius (°C) | N/A         | 16 °C         |

## ChangeOverCoolOff (ConstantNum17)

This variable is used to configure the water temperature above which 2 pipes change-over systems are considered to be in heating mode.

| ID                  | Units                | Valid Range | Default Value |
|---------------------|----------------------|-------------|---------------|
| Constant Numeric 17 | Degrees-Celsius (°C) | N/A         | 20 °C         |

# Sequence of Operation

## Occupancy Control

The nvoEffectOccup (nvoFP02) is managed based on nviSchedule and RoomOccupancy (BV2)

The nviSchedule is usually received from the network and the RoomOccupancy (BV2) is based on motion detection and occupancy overrides.

The following table describes the sequence of operation for the occupancy control:

| nviSchedule | RoomOccupancy (BV2) | nvoEffectOccup (nvoFP02)       |
|-------------|---------------------|--------------------------------|
| Occupied    | Occupied            | Occupied                       |
|             | Unoccupied          | Standby                        |
| Unoccupied  | Occupied            | Occupied                       |
|             | Unoccupied          | Unoccupied                     |
| Bypass      | Occupied            | Occupied / Bypass <sup>1</sup> |
|             | Unoccupied          | Standby                        |
| Standby     | Occupied            | Occupied                       |
|             | Unoccupied          | Standby                        |

Table 2: Occupancy Control

1. If no motion is connected and schedule is unoccupied, the bypass mode is activated for 60 minutes if the room occupancy is set to occupied (EC-Smart-Vue, EC-Smart-Sensor and EC-Smart-Comfort).

### Motion Hold Time

After the last occupancy detection, RoomOccupancy (BV2) is maintained to OCCUPIED for 15 minutes (motion hold time default value). If no detection happens during this period nvoEffectOccup (nvoFP02) is set to STANDBY (if nviSchedule = OCCUPIED) or UNOCCUPIED (if nviSchedule = UNOCCUPIED). When nviSchedule is UNOCCUPIED, this motion hold time is divided by 3.

## Temperature Setpoint Control

The actual setpoints nvoEffectHeatSp and the nvoEffectCoolSp are computed according to nvoEffectOccup (nvoFP02) nvoSetPtOffset

| nvoEffectOccup (nvoFP02) | nvoEffectHeatSp                               | nvoEffectCoolSp                               |
|--------------------------|-----------------------------------------------|-----------------------------------------------|
| Occupied or Bypass       | OccHeatSP (nciSetpoints) + nvoSetPtOffset     | OccCoolSP (nciSetpoints) + nvoSetPtOffset     |
| Standby                  | StandbyHeatSP (nciSetpoints) + nvoSetPtOffset | StandbyCoolSP (nciSetpoints) + nvoSetPtOffset |
| Unoccupied               | UnoccHeatSP (nciSetpoints)                    | UnoccCoolSP (nciSetpoints)                    |

Table 3: Actual setpoints values

The effective setpoint nvoEffectSetpt is computed according to HvacModeStatus:

| HvacModeStatus value | nvoEffectSetpt  |
|----------------------|-----------------|
| Heat or Off          | nvoEffectHeatSp |
| Cool                 | nvoEffectCoolSp |

Table 4: Effective setpoint value



## Fan Control

The fan is controlled according to nciFanSettings.FanCtrlType (nviFP39), nciFanSettings.FanCtrlMode, FanSpeedCmd (EV6), TerminalLoad (nvoFP06) and nvoEffectOccup (nvoFP02).

When configured for ECM Motor (Var Speed), the fan is controlled using a 0-10V signal on AO7. The fan start can also be connected on DO1.

When configured for a 3-speed fan (3Speed), the fan is controlled using DO1, DO2 and DO3.

| Fan Type setting     | FanSpeed-Cmd (EV6) | nciFanSet-tings.FanCtrlMode | Fan management                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------|--------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| None                 | Any                | Any                         | Outputs DO1, DO2, DO3 and AO7 are not used.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ECM Motor (VarSpeed) | Auto               | On                          | The fan is set to FanSpeed1Level (nciFanSettings) and the fan request based on the TerminalLoad (nvoFP06).<br>See Temperature Management for more details.                                                                                                                                                                                                                                                                                                           |
|                      |                    | Auto                        | The fan is set to the fan request based on TerminalLoad (nvoFP06). See Temperature Management for more details.<br>If the system is controlled by a return temperature sensor, the fan will be enabled at minimum speed for 5 minutes every 2 hours to validate the temperature reading.                                                                                                                                                                             |
|                      |                    | Smart                       | When nvoEffectOccup (nvoFP02) is occupied, the fan is controlled in On FanCtrlMode.<br>When nvoEffectOccup (nvoFP02) is not occupied, the fan is controlled in Auto FanCtrlMode.<br>When in unoccupied mode, if the system is controlled by a return temperature sensor, the fan will be enabled at minimum speed for 5 minutes every 2 hours to validate the temperature reading.                                                                                   |
|                      | Off                | Any                         | The fan is set to 0% unless the system is in freeze protection mode/ In that case the fan is set to HeatMaxFan (nviFP39)                                                                                                                                                                                                                                                                                                                                             |
|                      | Low                |                             | The fan is set to FanSpeed1Level (nciFanSettings).                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                      | Med                |                             | The fan is set to FanSpeed2Level (nciFanSettings).                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                      | High               |                             | The fan is set to FanSpeed3Level (nciFanSettings).                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3 Speed Fan          | Auto               | On                          | The fan will always be at least at Speed1.<br>Fan speed2 will be enabled when the fan request based on TerminalLoad (nvoFP06) is greater than FanSpeed2Level (nciFanSettings).<br>Fan speed3 will be enabled when the fan request based on TerminalLoad (nvoFP06) is greater FanSpeed3Level (nciFanSettings).<br>See Temperature Management for more details about fan request.                                                                                      |
|                      |                    | Auto                        | Fan speed1 will be enabled when the fan request based on TerminalLoad (nvoFP06) is greater than FanSpeed1Level (nciFanSettings).<br>Fan speed2 will be enabled when the fan request based on TerminalLoad (nvoFP06) is greater than FanSpeed2Level (nciFanSettings).<br>Fan speed3 will be enabled when the fan request based on TerminalLoad (nvoFP06) is greater FanSpeed3Level (nciFanSettings).<br>See Temperature Management for more details about fan request |
|                      |                    | Smart                       | When the nvoEffectOccup (nvoFP02) is occupied, the fan is controlled in On FanCtrlMode.<br>When the OccupancyStatus is not occupied, the fan is controlled in Auto FanCtrlMode.<br>When in unoccupied mode, if the system is controlled by a return temperature sensor, the fan will be enabled at minimum speed for 5 minutes every 2 hours to validate the temperature reading.                                                                                    |
|                      | Off                | Any                         | The fan is set to off unless the system is in freeze protection mode. In that case the fan is set to maximum speed.                                                                                                                                                                                                                                                                                                                                                  |
|                      | Low                |                             | The fan is set to fan speed 1.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                      | Med                |                             | The fan is set to fan speed 2.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                      | High               |                             | The fan is set to fan speed 3.                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Table 5: Fan Control

Whenever the system is in freeze protection mode, the fan is set to HeatMaxFan (nviFP39).

When the fan request switches from active to inactive, the FanOffDelay is enabled if equipments were being controlled before stopping the fan.

## HVAC Mode Management

The nvoHeatCool is computed according to nviApplicModeTerminalLoad (nvoFP06)nvoWindowContact, nviSpaceTemp and FreezepProtSp (nviFP44)

A ChgOverDelay (nviFP44) prevents the nvoHeatCool from switching between cooling and heating too often.

| nviSpaceTemp                | nvoWindowContact | nviApplicMode   | TerminalLoad<br>(nvoFP06) | nvoHeatCool                                                                                                                |
|-----------------------------|------------------|-----------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------|
| >FreezepProtSp<br>(nviFP44) | Open             | Any             | Any                       | Off                                                                                                                        |
|                             | Closed           | Auto            | >0                        | Cool mode                                                                                                                  |
|                             |                  |                 | <0                        | Heat mode                                                                                                                  |
|                             |                  |                 | =0                        | Unchanged                                                                                                                  |
|                             |                  | Other than Auto | Any                       | nviApplicMode                                                                                                              |
| <FreezepProtSp<br>(nviFP44) | Any              | Any             | Any                       | Heat mode, the fan and the heating outputs are overridden to 100% until nviSpaceTemp reaches FreezepProtSp (nviFP44) +2°C. |

Table 6: HVAC modes

## Temperature Management

### Cooling Mode

The cooling or change-over valve is controlled in sequence with the fan speed to maintain the space temperature to the actual cooling setpoint nvoEffectCoolSp.

The cooling or change-over valve is:

- ☐ **rescaled** between 0% to 100% when the TerminalLoad (nvoFP06) is between 0% and 100%.
- ☐ **disabled** when the fan is not running unless the nciFanSettings.FanCtrlType (nviFP39) is set to None.
- ☐ **disabled** while in cooling mode if a condensation sensor input is active on DI5 or received from a master controller.

The fan speed request is rescaled between 0% and CoolMaxFan (nviFP39) when the TerminalLoad (nvoFP06) is between FanCoolLow and FanCoolHigh.

### Heating Mode

The heating or change-over valve is controlled in sequence with the electric heater and the fan speed to maintain the space temperature to the actual cooling setpoint nvoEffectHeatSp.

- ☐ If the system is not equipped with an electric heater, the heating or change-over valve is rescaled between 0% and 100% when TerminalLoad (nvoFP06) is between 0% and 100%.
- ☐ If the system is equipped with an electric heater, the heating or change-over valve is rescaled between 0% to 100% when TerminalLoad (nvoFP06) is between 0% and 50% while the electric heater is rescaled between 0% to 100% when TerminalLoad (nvoFP06) is between 50% and 100%.

The heating or change-over valve and the electric heater are disabled when the fan is not running unless the nciFanSettings.FanCtrlType (nviFP39) is set to None.

The fan speed request is rescaled between 0% and HeatMaxFan (nviFP39) when TerminalLoad (nvoFP06) is between FanHeatLow and FanHeatHigh.

## Damper Control

The damper control is based is on SpaceCO2, CoolingLoad, and nvoEffectOccup (nvoFP02)  
The CO2 load is calculated using PID\_CO2 nvoSpaceCO2 as measured value and nciSpaceCO2Lim.

| nvoEffectOccup (nvoFP02) | EnableFreeCooling (BC1) | Damper management                                                           |
|--------------------------|-------------------------|-----------------------------------------------------------------------------|
| Unoccupied               | Any                     | The damper is closed to 0%.                                                 |
| Occupied or Bypass       | Enable                  | The damper is controlled by the grater of the CO2 and Cooling load signals. |
|                          | Disable                 | The damper is controlled by the CO2 load.                                   |
| Standby                  | Enable                  | The damper is controlled by the Cooling load.                               |
|                          | Disable                 | The damper is closed to 0%.                                                 |

Table 7: Damper Control

## Discharge Temperature Control

The discharge temperature control allows the limitation of the heating and/or cooling valve depending on the configuration of nciMiscConfig.DischargAirLimitType (nviFP44) and of the matching PID value (MaxDischAirLimit (PID4) / MinDischAirLimit (PID5)):

- ☐ Heating valve limitation (if nciMiscConfig.DischargAirLimitType (nviFP44) = Highlimit or High-LowLimit): the heating valve is limited by MaxDischAirLimit (PID4) which is calculated depending on the discharge temperature and nciMiscConfig.MaxDischAirSP (nviFP44): the valve opening is limited to the minimum value between Heating Load and MaxDischAirLimit (PID4).
- ☐ Cooling valve limitation (if nciMiscConfig.DischargAirLimitType (nviFP44) = LowLimit or High-LowLimit): the cooling valve is limited by MinDischAirLimit (PID5) which is calculated depending on the discharge temperature and nciMiscConfig.MinDischAirSp (nviFP44) , the valve opening is limited to the minimum value between Cooling Load and MinDischAirLimit (PID5).

# Master/Slave Control

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## Principles

### Local temperature management

The slave devices use their own temperature for control. The master device sends information to limit the slave that uses its own information.

Limiting the slave device in heating // cooling mode avoids having different modes in a single zone. The slave device always has the same mode as the master.

### Centralized temperature management

The slave device uses the master device temperature to control its equipments with `nvoSpaceTemp`. The slave device does not use its own temperature but the temperature used by the master device. Nevertheless, the master device can average the local temperatures sent by the slave devices (`nvoLocalSpaceTemp` on the master's `nviSpacetempAvg` to send that average value to the slave devices. Master and slave devices all use the averaged temperature from all the sensors within the zone for control.

The slave device takes the same PID value as the master device via `nvoTerminalLoad`. The slave device has the same mode and the same demand as the master. All the control is achieved by the master. Nevertheless, the slave keeps its own valve parameters (rescaling).

### Temperature setpoint management

The slave uses the same occupancy status as the master via `nvoEffectOccup`. The slave will therefore have the same occupancy status as the master, and temperature setpoints will change depending on this occupancy status.

The slave uses the same setpoint offset as the master via `nvoSetPtOffset`. The slave therefore has the same setpoint offset as the master, but uses its own setpoint parameters, which can differ from the master.

### Fan management

The slave uses local control for the automatic control of its fan, if `nvoTerminalLoad` is unused, but overrides are managed by the master using `nvoFanSpeedCmd`. The slave will have the same fan speed as the master when the occupant manually overrides the fan speed settings with the room device.

The slave has the same fan speed as the master, whereas in Auto mode or overridden if `nvoFanSpeed` is binded to the slave's `nviFanSpeedCmd`. In this case, the slave does not control its fan any more.

### Total Master Management

The slave uses the equipment values from the master using `nvoUnitStatus`. The slave behavior is identical to the master.

# Bindings

## nvoTerminalLoad Bindings

Using nvoTerminalLoad, the master can control all the equipments in parallel

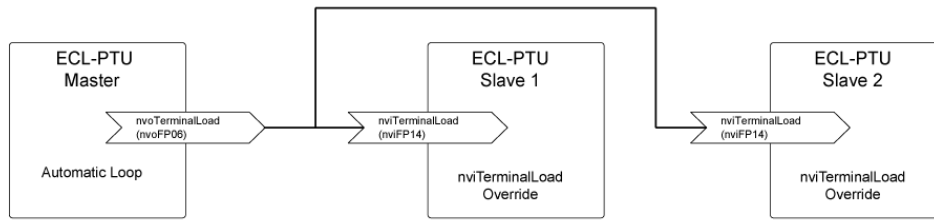


Figure 1: nvoTerminalLoad-Bindings

## nvoEffectOccup Bindings

Using nvoEffectOccup, the master can control the occupancy of slave controllers by linking nvoEffectOccup to nviOccManCmd of slave controllers.

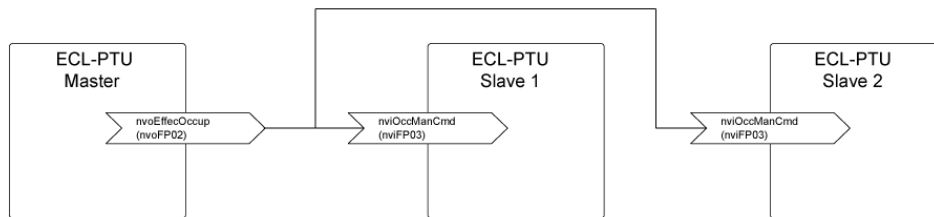


Figure 2: nvoEffectOccup-Bindings

## nvoHeatCool Bindings

Using nvoHeatCool, the master controller can make sure that all the controllers in a zone are controlled based on the same operating mode.

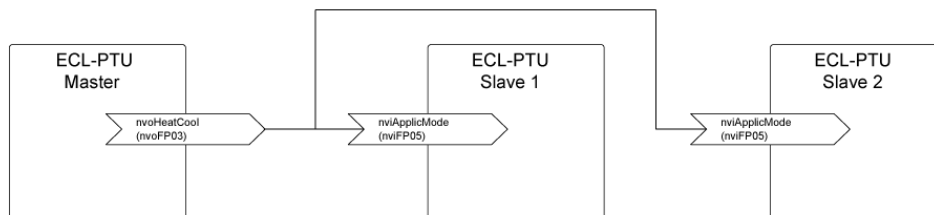


Figure 3: nvoHeatCool-Bindings

## nvoSpaceTemp Bindings

Using nvoSpaceTemp, the master can transfer it's own temperature to all the slaves in the zone.

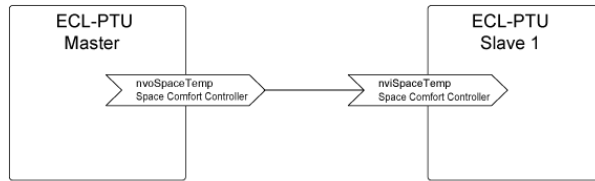


Figure 4: nvoSpaceTemp-Bindings

## nvoSetPtOffset Bindings

Using nvoSetPtOffset, the master can transfer the setpoint offset to all the controllers in the zone. The master will always output the last valid value received via nviSlaveInfo.

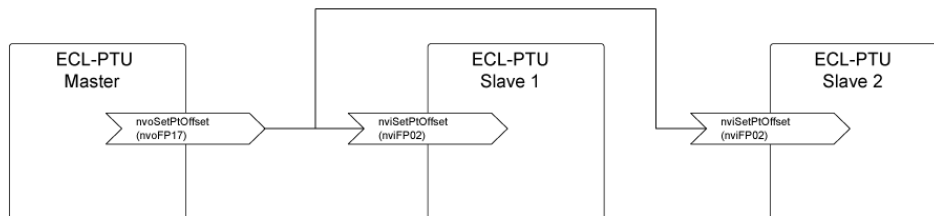


Figure 5: nvoSetPtOffset-Bindings

## nvoSlaveInfo Bindings

All the controllers, including the master itself must send their nvoSlaveInfo to the variable nviSlaveInfo of the master controller. The master will use this variable to calculate occupancy detection and all other relevant information.

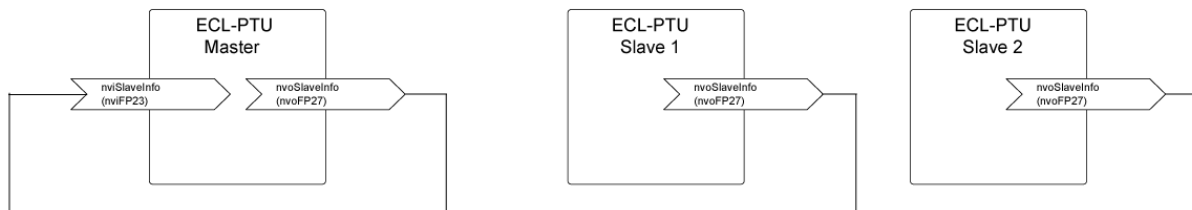


Figure 6: nvoSlaveInfo-Bindings

## nvoWindowContact Bindings

All the controllers, including the master itself must send their nvoWindowContact to the variable nviWindowContact of the master controller. The master will use these values to calculate the nvoEnergyHoldOff.

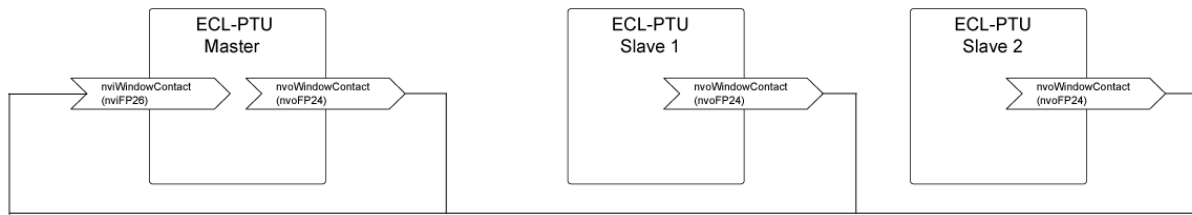


Figure 7: nvoWindowContact-Bindings

## nvoEnergyHoldOff Bindings

Using nvoEnergyHoldOff, the master can synchronise the energy hold off value between controllers when a window is open in the zone.

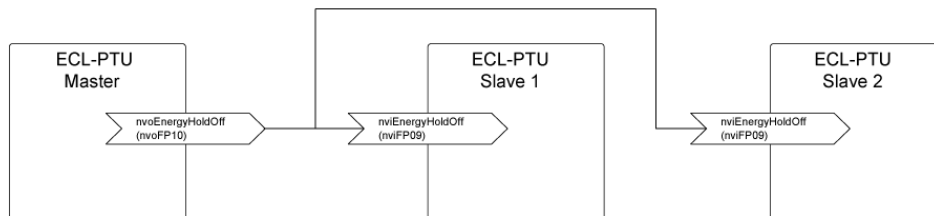


Figure 8: nvoEnergyHoldOff-Bindings

## FanSpeed Bindings

### nvoFanSpeed

Using nvoFanSpeed, the master send FanSpeed value to every slave via nviFanSpeedCmd.

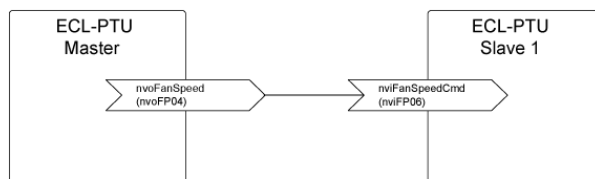


Figure 9: nvoFanSpeed

## ***nvoFanSpeedCmd***

Using nvoFanSpeedCmd, the master send FanSpeedCmd (override) value to every slave via nviFanSpeedCmd.

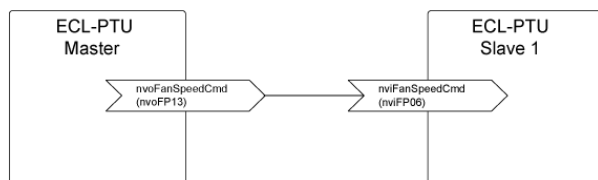


Figure 10: nvoFanSpeedCmd

## **HVAC Bindings**

Using nvoUnitStatus, the master send every HVAC value (Fanspeed, Valves, Damper, Hvac Mode and Electric heater).

This enables all the units to work based on the control signal of the master.

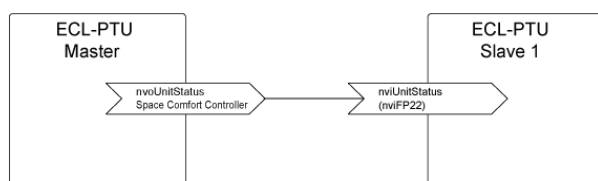


Figure 11: HVAC-Bindings



# Using the dcgfxApplications

This chapter explains how to access the preloaded applications using EC-Net Pro and how to navigate the dc *gfxApplications* interface. Various aspects of the dc *gfxApplications* interface are explained, including how to configure equipment settings and setting up trends to be followed.

## Accessing the Preloaded Applications with EC-Net Pro

The ECL-PTU Series preloaded applications can be found in the dc *gfxApplications* module in the template side bar.

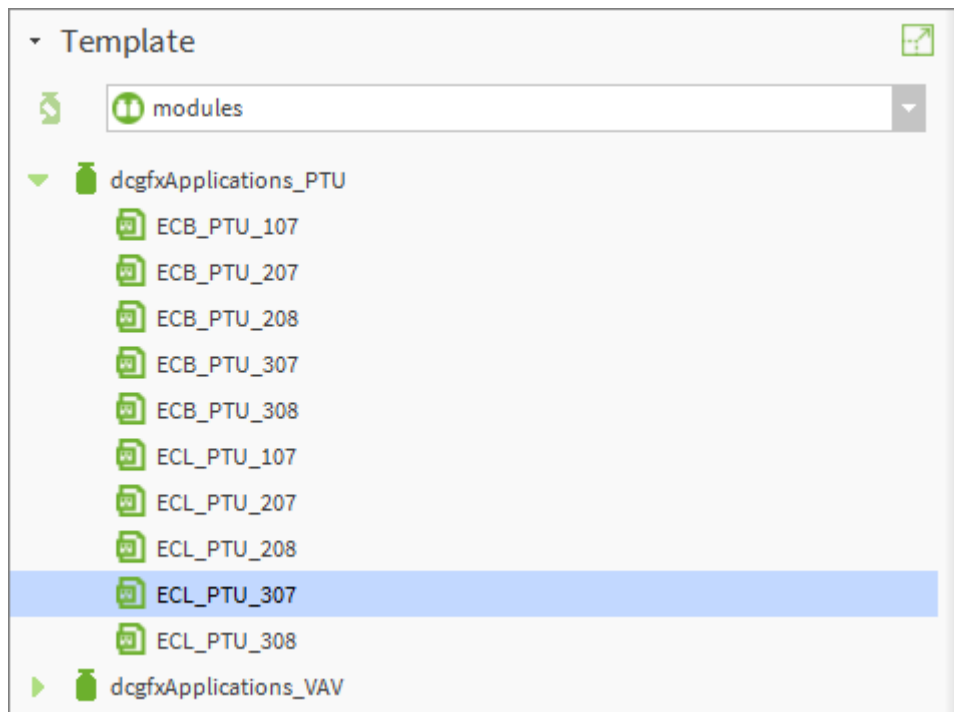
Certain elements must be installed on the EC-Net platform being used, namely:

- ☐ EC-Net Support Package
- ☐ dclmages
- ☐ Haystack tagging
- ☐ dcgfxApplications

For information on how to prepare an EC-Net station and how to install the dcgfxApplications palette or module in an EC-BOS, refer to the *Productivity Enhancing Tools User Guide*.

To access the preloaded applications of an ECL-PTU controller, it must be first created in the BcpLonNetwork driver of the configured station and then matched with an existing device in the BcpLonNetwork. 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 *gfxApplications* modules folder in the template sidebar



- Click and drag the name of a controller model from the *dcgfxApplications* module to the **BcpLonNetwork** driver of the configured station. Assign an appropriate name to the newly created device.

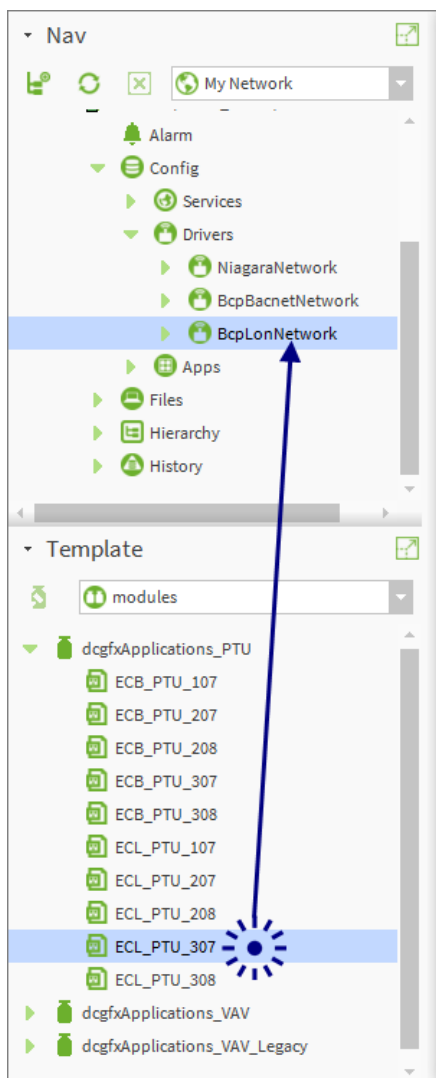


Figure 12: Adding device to the BcpLonNetwork driver



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**.

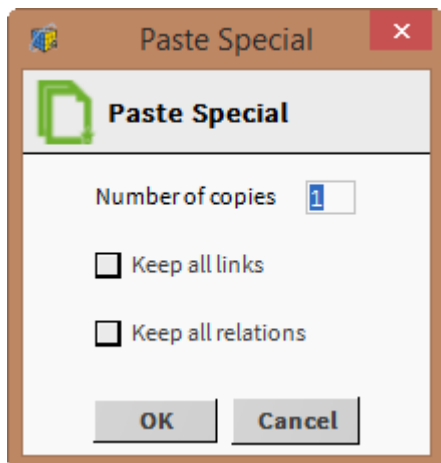


Figure 13: Adding Multiple Copies of a Device

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 BcpLonNetwork database appears in the bottom section.
5. Select the discovered device that is to be matched with the one just added to the database. Click **Match**.

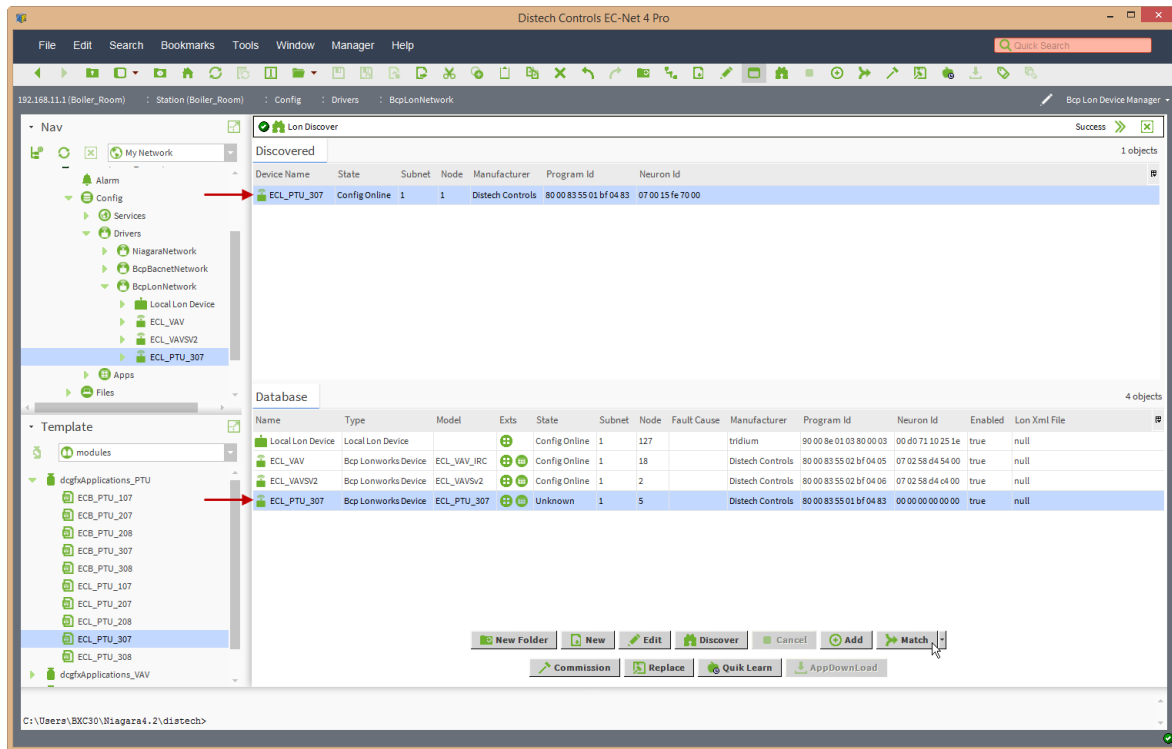


Figure 14: Matching discovered device with Device in Database

The **Match** window appears.

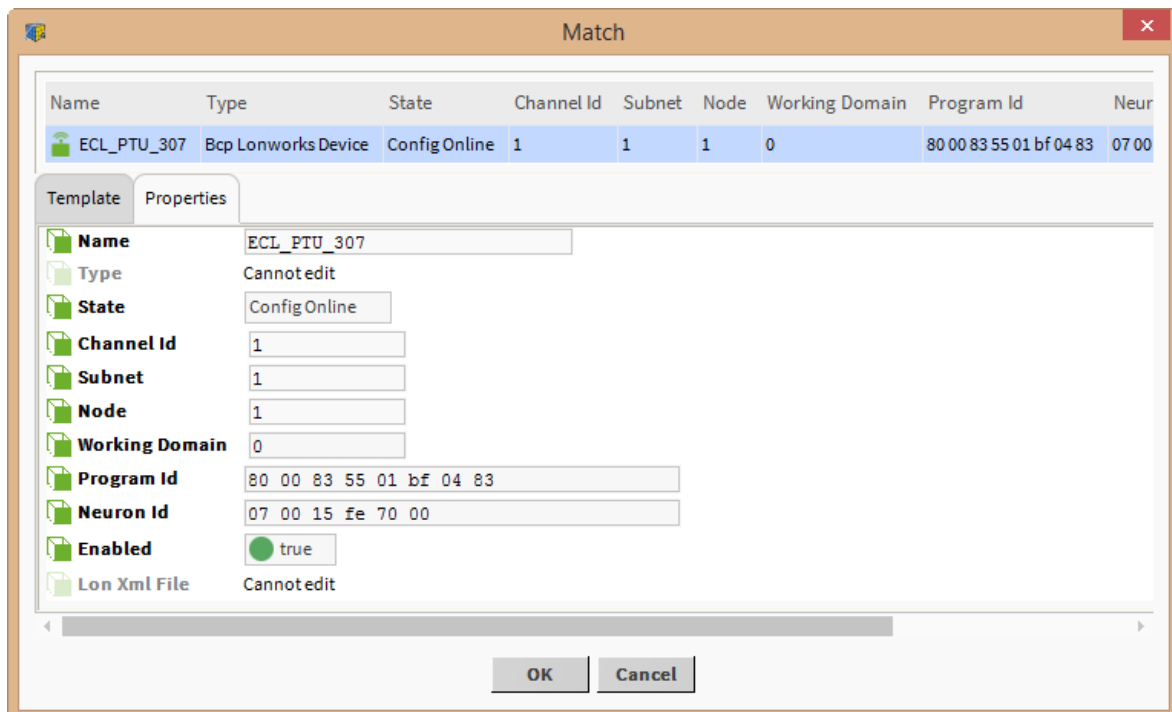


Figure 15: Match Window

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**.

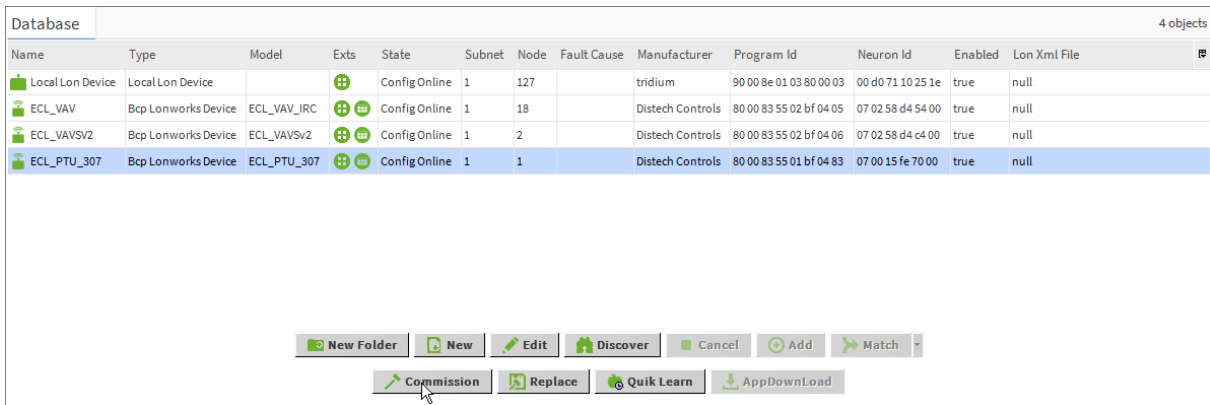


Figure 16: Commissioning the Device

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.
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**.

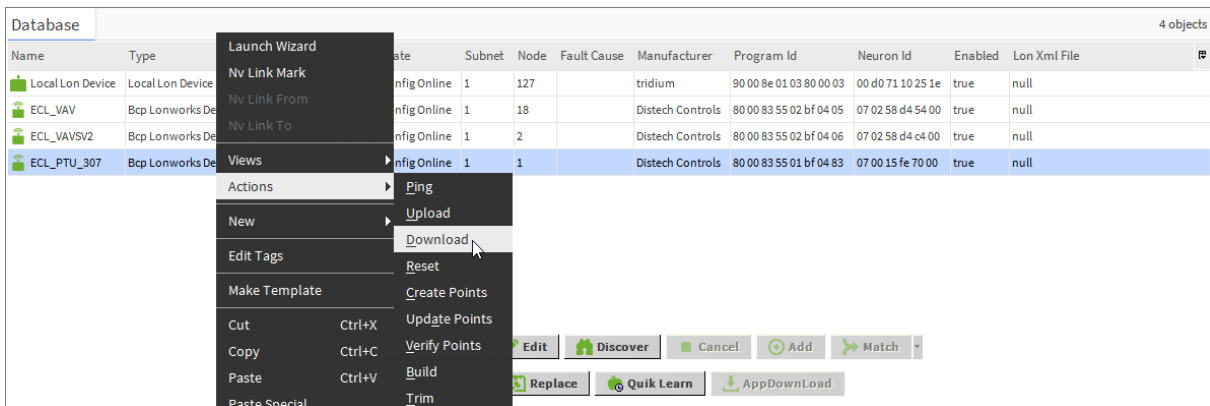


Figure 17: Action Download - Action Upload

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 device. An overview of the system in place appears in the View pane.

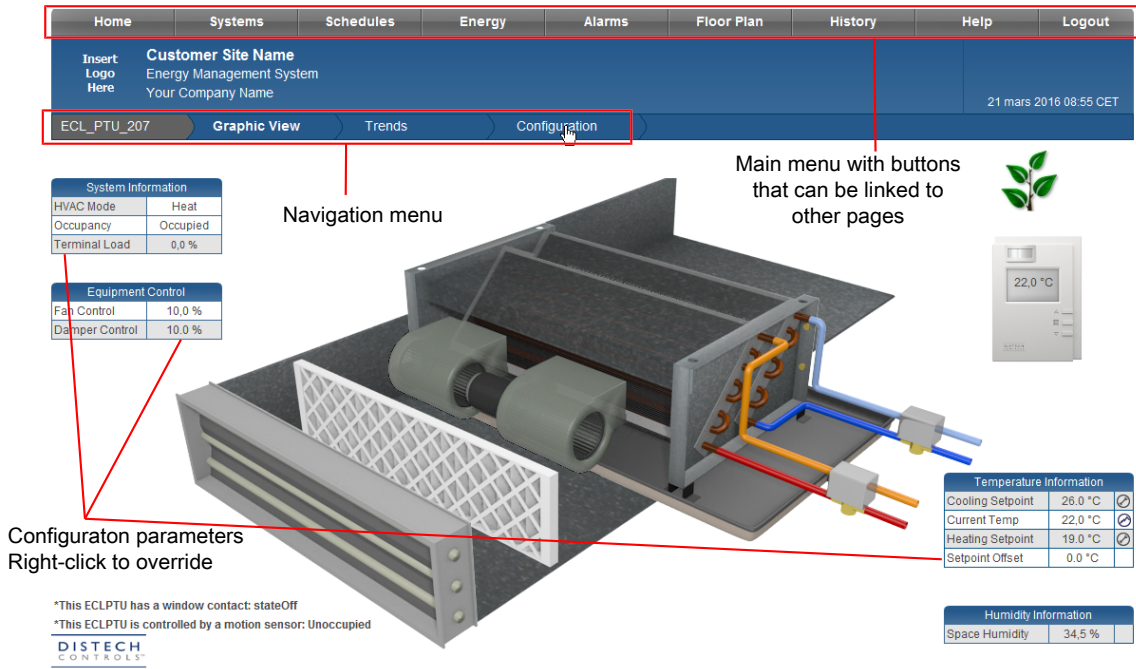


Figure 18: ECL-PTU System View with various parts explained

## Configuring the PTU with EC-Net 4

The preloaded applications can easily be configured from within the dcgfxApplications interface. All the configuration parameters related to the equipment setup as well as its input and output settings are accessible from the **Configuration** page and are grouped into several tables.

To select the **Configuration** page:

In the navigation menu at the top of the system view, click **Configuration**.

The **Configuration** page appears.

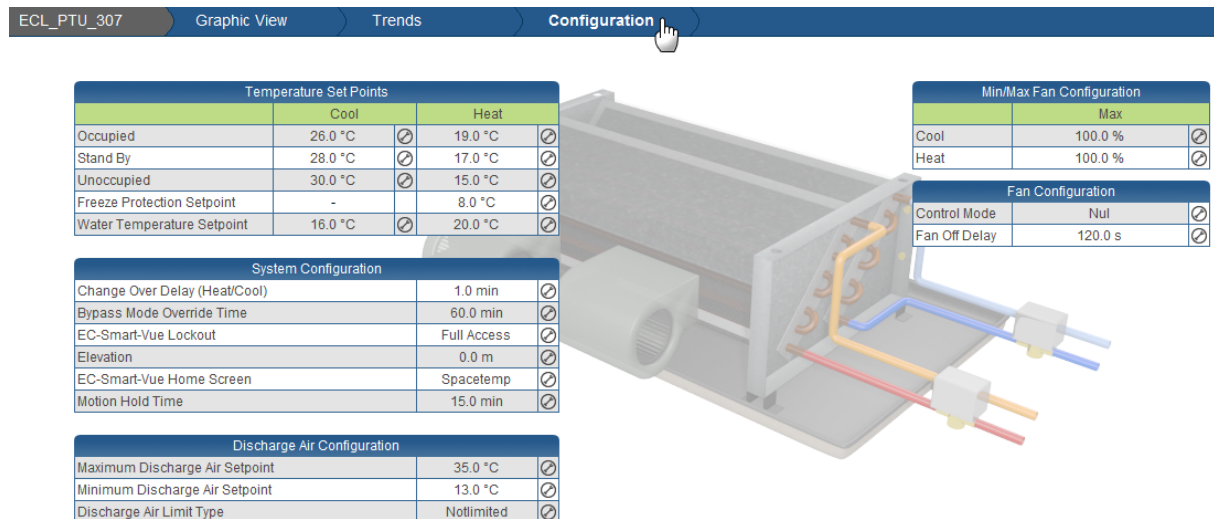


Figure 19: Configuration Page

## Configuring the Space Temperature Setpoints

The **Temperature Setpoints** table contains the heating and cooling setpoints for the occupied, standby and unoccupied modes. Each setpoint can be easily set using its corresponding Edit button. The table below gives a brief description of each type of setpoint.

| Temperature Set Points     |         |  |         |
|----------------------------|---------|--|---------|
|                            | Cool    |  | Heat    |
| Occupied                   | 26.0 °C |  | 19.0 °C |
| Stand By                   | 28.0 °C |  | 17.0 °C |
| Unoccupied                 | 30.0 °C |  | 15.0 °C |
| Freeze Protection Setpoint | -       |  | 8.0 °C  |
| Water Temperature Setpoint | 16.0 °C |  | 20.0 °C |

Figure 20: Temperature Setpoints

| Parameter                  | 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. |
| Freeze Protection Setpoint | The limit at which the system is maintained to prevent freezing conditions.                                                                                                                                                                                                                                                                                                  |
| Water Temperature Setpoint | Enter the desired setpoints for heating and cooling water.                                                                                                                                                                                                                                                                                                                   |

## Configuring the System Parameters

In the **System Configuration** table, general controller parameters are set such as the changeover delay and bypass mode override time. In addition, the Allure EC-Smart-View'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          |             |                                                                                     |
|-------------------------------|-------------|-------------------------------------------------------------------------------------|
| Change Over Delay (Heat/Cool) | 1.0 min     |  |
| Bypass Mode Override Time     | 60.0 min    |  |
| EC-Smart-View Lockout         | Full Access |  |
| Elevation                     | 0.0 m       |  |
| EC-Smart-View Home Screen     | Spacetime   |  |
| Motion Hold Time              | 15.0 min    |  |

Figure 21: System Configuration

| Parameter                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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.<br>In addition, if a motion sensor is present, the bypass mode override time represents how long the controller remains in occupied mode (no room occupancy is detected) before returning the controller to standby mode.                                                                                                                                                                                                                                                                                                                             |
| EC-Smart-View Lockout         | Defines how much access a user of the Allure EC-Smart-View has to the controller's configuration parameters. The Allure EC-Smart-View 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.<br>Regardless of the access level of the Allure EC-Smart-View, the controller's configuration parameters cannot be modified through the Allure EC-Smart-View except after a password is entered. To learn how to perform various functions using the Allure EC-Smart-View's basic and advanced menus, see Allure EC-Smart-View Screen-by-Screen Guide. |
| Elevation                     | For accurate CO <sub>2</sub> concentration levels, input geographic elevation here if elevation is greater than 152m above sea level. By default, the sensor is factory calibrated to sea level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| EC-Smart-View Home Screen     | Indicate whether <b>SpaceTemp</b> , <b>SpOffset</b> , <b>MidSetpoint</b> , or <b>EffectSP</b> will be the home screen on the connected Smart-View sensor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Motion Hold Time              | Enter the amount of time the motion sensor is on hold after first being initiated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## Discharge Air Configuration

The following table describes the discharge air parameters that can be configured.

| Discharge Air Configuration    |            |                                                                                     |
|--------------------------------|------------|-------------------------------------------------------------------------------------|
| Maximum Discharge Air Setpoint | 35.0 °C    |  |
| Minimum Discharge Air Setpoint | 13.0 °C    |  |
| Discharge Air Limit Type       | Notlimited |  |

Figure 22: Discharge Air Configuration

| Parameter                      | Description                                                                                                                                                                                                                                                                      |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum Discharge Air Setpoint | Enter the desired setpoint for heating discharge air. The duct heater is limited when the discharge air temperature reaches this setpoint.                                                                                                                                       |
| Minimum Discharge Air Setpoint | Enter the desired setpoint for cooling discharge air. The duct cooling is limited when the discharge air temperature reaches this setpoint.                                                                                                                                      |
| Discharge Air Limit Type       | <b>notLimited</b> – No limits for discharge air temperature.<br><b>lowLimit</b> – Limit to cooling discharge air temperature.<br><b>highLimit</b> – Limit to heating discharge air temperature.<br><b>highLowLimit</b> – Limit to heating and cooling discharge air temperature. |

## Minimum and Maximum Fan Configuration

The following table describes the minimum and maximum fan configuration.

| Min/Max Fan Configuration |         |                                                                                    |
|---------------------------|---------|------------------------------------------------------------------------------------|
|                           | Max     |                                                                                    |
| Cool                      | 100.0 % |   |
| Heat                      | 100.0 % |  |

Figure 23: Minimum and Maximum Fan Configuration

| Parameter                      | Description                             |
|--------------------------------|-----------------------------------------|
| Maximum Discharge Air Setpoint | Set the maximum discharge air setpoint. |
| Minimum Discharge Air Setpoint | Set the minimum discharge air setpoint. |

## Fan Configuration

The following table describes the fan configuration.

| Fan Configuration |            |                                                                                     |
|-------------------|------------|-------------------------------------------------------------------------------------|
| Control Mode      | Continuous |  |
| Fan Off Delay     | 120.0 s    |  |

Figure 24: Fan Configuration

| Parameter     | Description                                                                                                                                                                                                                                                                                                                                    |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control Mode  | <b>Continuous</b> – Fan continuously operating<br><b>Cycle</b> – Fan cycling based on heating/cooling load<br><b>Con Cycle</b> – Fan continuously operating in occupied mode and cycling during unoccupied periods<br><b>Cycle Heat</b> – Fan cycling based on heating load only<br><b>Cycle Cool</b> – Fan cycling based on cooling load only |
| Fan Off Delay | Amount of time before the fan enters standby.                                                                                                                                                                                                                                                                                                  |



## 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 Pro, expand the **Services** folder of the configured station.
2. Double-click **HistoryService**.

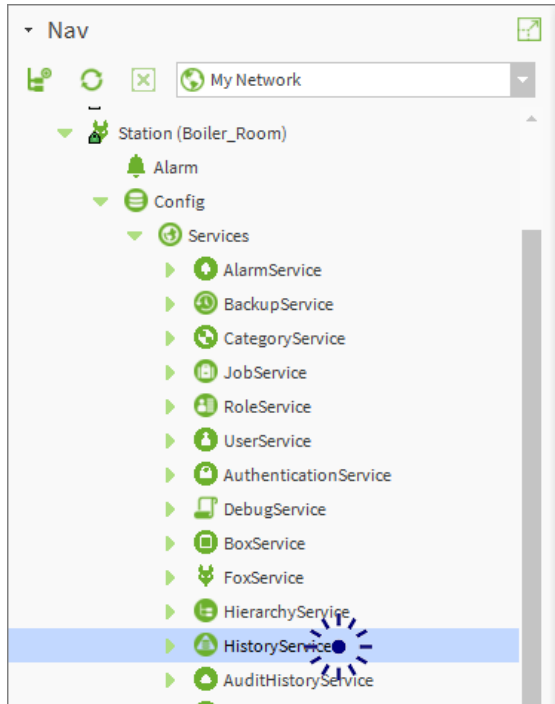


Figure 25: Double-clicking HistoryService

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

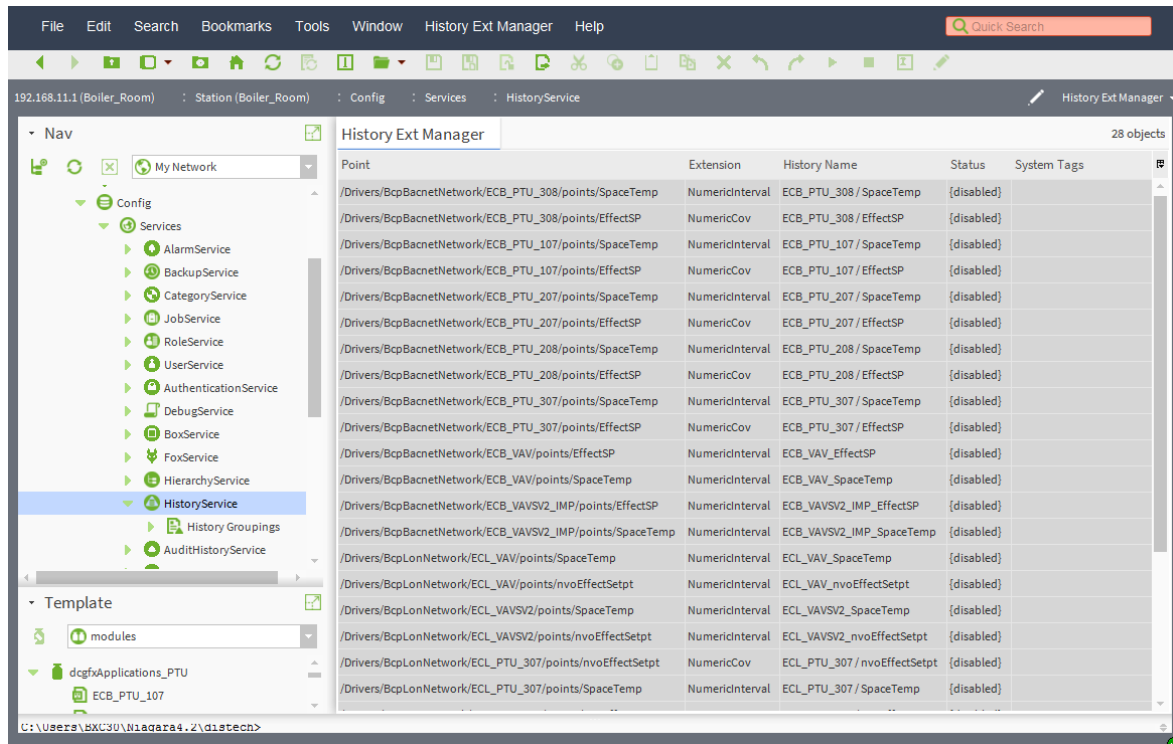


Figure 26: History Extension Manager

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 PTU controllers, which appear greyed out.

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

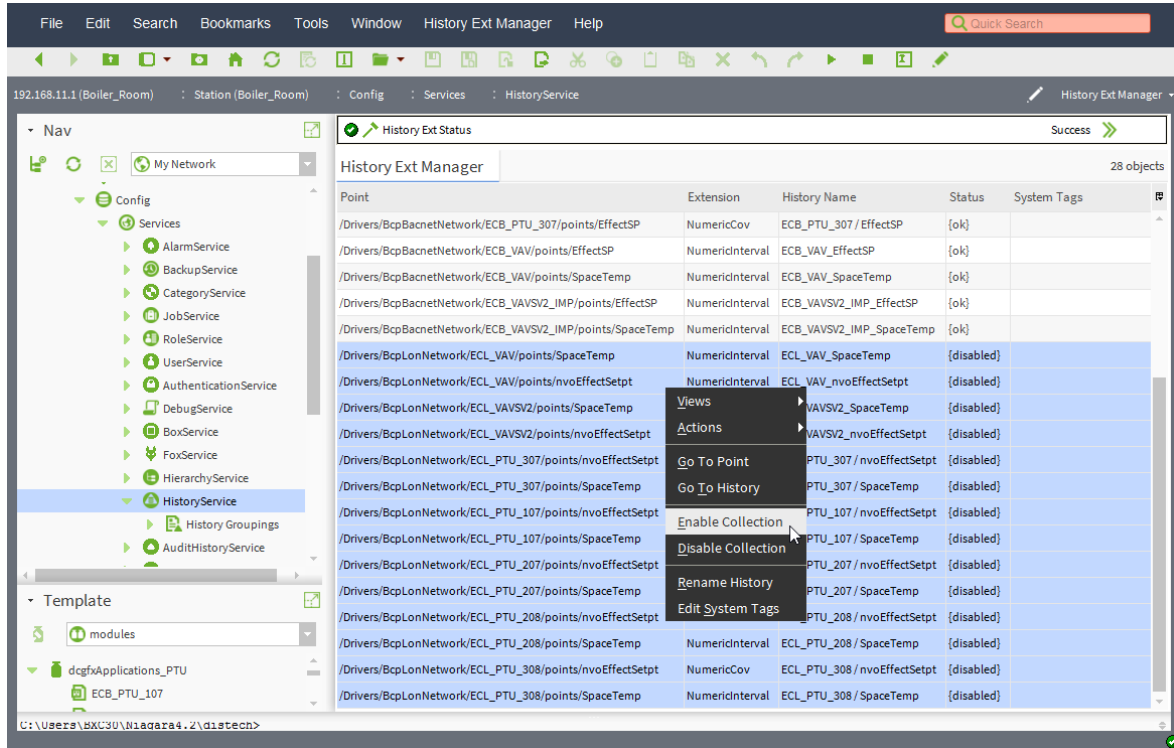


Figure 27: Enabling Numeric Interval Extensions

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

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

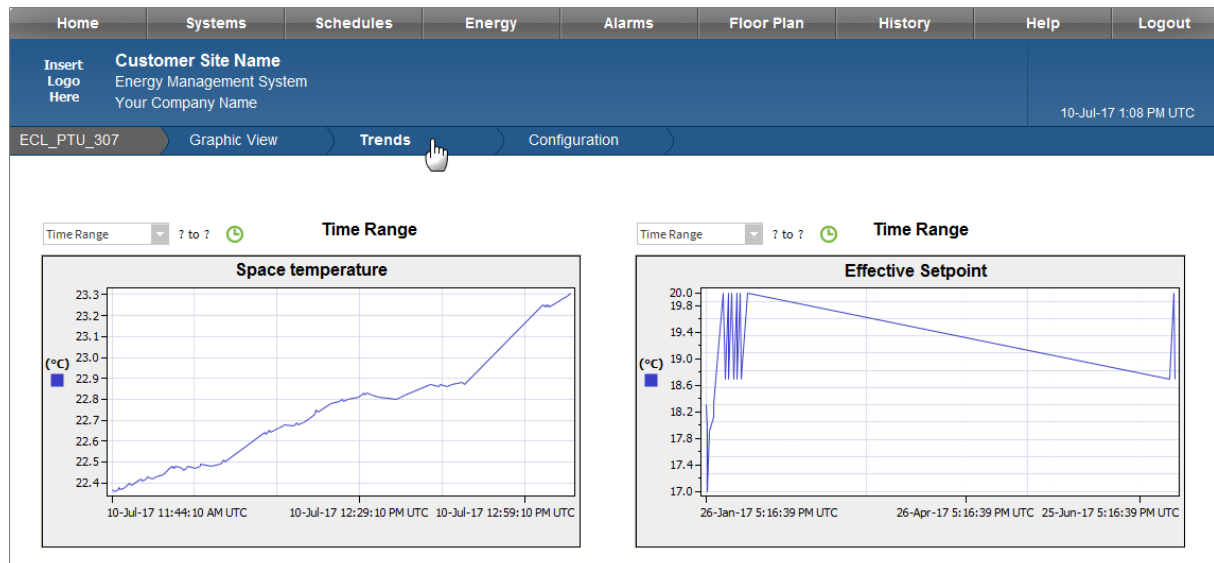


Figure 28: Trends Page

# Configuring the Preloaded Applications

The PTU's preloaded applications can easily be configured from within EC-gfxProgram. The configuration parameters related to a PTU as well as its input and output settings are accessible through the **Configuration Assistant**.

To access the **Configuration Assistant** page:

In the Nav sidebar, right click the device you wish to configure and click **Launch Wizard**.

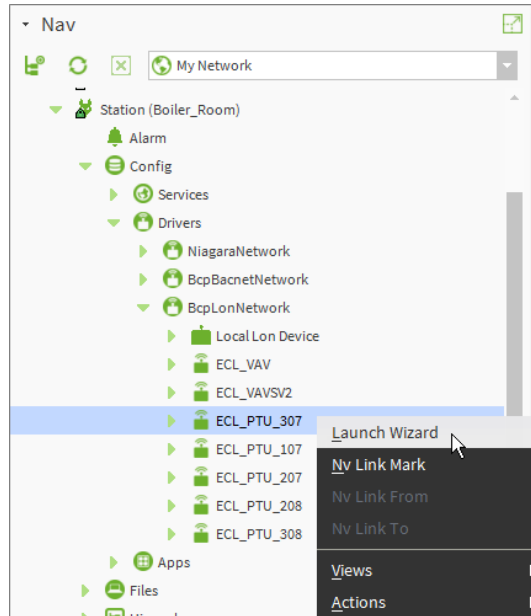


Figure 29: Launching the Wizard from the Nav sidebar

The **Configuration Assistant** page appears.

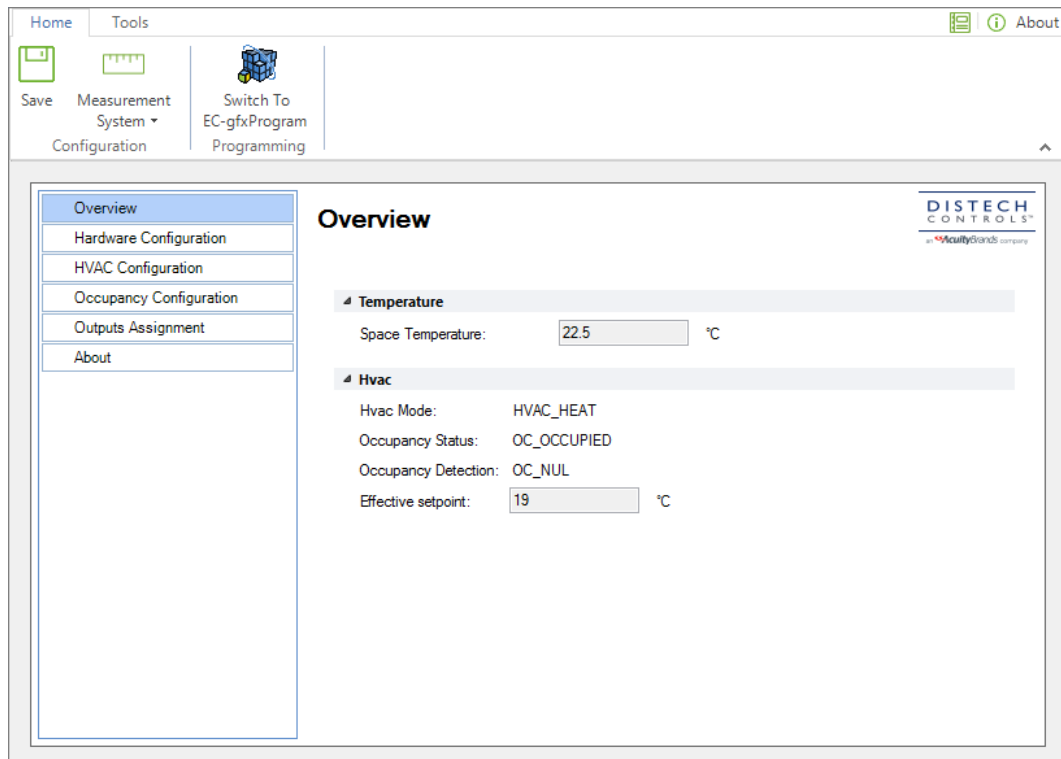


Figure 30: Configuration Assistant page in EC-gfxProgram

## Overview

The **Overview** tab of the Configuration Assistant allows a user to view many general settings that are conveniently located.

|          |                                                                                                                                                                                                                                                                                                                              |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Overview | <h3>Overview</h3> <div> <div> Temperature </div> <div> Space Temperature: <input type="text" value="22.5"/> °C </div> </div> <div> <div> Hvac </div> <div> Hvac Mode: HVAC_HEAT<br/> Occupancy Status: OC_STANDBY<br/> Occupancy Detection: OC_NUL<br/> Effective setpoint: <input type="text" value="17"/> °C </div> </div> |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Figure 31: Overview tab general settings

## Hardware Configuration

The **Hardware Configuration** tab includes Inputs, Outputs and Room Sensors configuration. A brief description of each type of configuration parameter is outlined below.

|                         |                                                                                                                                       |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Overview                | <h3>Hardware Configuration</h3> <div> <div>Inputs Configuration</div> <div>Outputs Configuration</div> <div>Room Sensors</div> </div> |
| Hardware Configuration  |                                                                                                                                       |
| HVAC Control            |                                                                                                                                       |
| Occupancy Configuration |                                                                                                                                       |
| About                   |                                                                                                                                       |

Figure 32: Hardware Configuration Tab

## Inputs Configuration

All input configuration setpoint parameters are found in the **Inputs Configuration** subsection of the **Hardware Configuration** tab.

The screenshot shows the 'Inputs Configuration' subsection with the following settings:

- UI1 Configuration: CO2 Sensor
- UI2 Configuration: Spoffset
- SI3 Configuration: spaceTemp
- DI4 Configuration: Unused
- DI5 Configuration: Unused
- DI6 Configuration: Unused
- CO2 Range: 2,000 ppm
- Space Temperature Calibration: 0 Δ °F
- Discharge Temperature Calibration: 0 Δ °K
- Return Temperature Calibration: 0 °F

Figure 33: Inputs Configuration subsection

| Parameter                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UI2 Configuration                 | <b>Unused</b> – not used.<br><b>Discharge Temp</b> – Discharge Temperature sensor.<br><b>Return Temp</b> – Return air Temperature sensor.<br><b>Water Temp</b> – Water Temperature sensor.<br><b>SpOffset</b> – Setpoint offset of the EC-Sensor-SO.                                                                                                                                                                                                                                     |
| SI3 Configuration                 | <b>Unused</b> – not used.<br><b>Discharge Temp</b> – Discharge Temperature sensor.<br><b>Return Temp</b> – Return air Temperature sensor.<br><b>Water Temp</b> – Water Temperature sensor.<br><b>SpaceTemp</b> – Space Temperature sensor.                                                                                                                                                                                                                                               |
| DI4 Configuration                 | <b>Unused</b> – not used.<br><b>WindowContactNO</b> – Normally open window contact. (Closed contact = Open window).<br><b>WindowContactNC</b> – Normally closed window contact (Closed contact = Closed window).                                                                                                                                                                                                                                                                         |
| DI5 Configuration                 | <b>Unused</b> – not used.<br><b>AuxContactNO</b> – Normally open auxiliary contact.<br><b>AuxContactNC</b> – Normally closed auxiliary contact.<br><b>ChangOverHtg</b> – Change-over input. (Closed contact = Heating mode).<br><b>ChangOverClg</b> – Change-over input. (Closed contact = Cooling mode).<br><b>CondSensorNO</b> – Normally open condensation sensor. (Closed contact = Alarm).<br><b>CondSensorNC</b> – Normally closed condensation sensor. (Closed contact = Normal). |
| DI6 Configuration                 | <b>Unused</b> – not used.<br><b>AuxContactNO</b> – Normally open auxiliary contact.<br><b>AuxContactNC</b> – Normally closed auxiliary contact.<br><b>ChangOverHtg</b> – Change-over input. (Closed contact = Heating mode).<br><b>ChangOverClg</b> – Change-over input. (Closed contact = Cooling mode).<br><b>OccSensorNO</b> – Normally open occupancy sensor. (Closed contact = occupied).<br><b>OccSensorNC</b> – Normally closed occupancy sensor. (Closed contact = unoccupied).  |
| CO <sub>2</sub> Range             | Set the CO <sub>2</sub> upper limit for the sensor (0V=0 ppm and 10V=CO <sub>2</sub> range)                                                                                                                                                                                                                                                                                                                                                                                              |
| Space Temperature Calibration     | Set the space temperature calibration offset.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Discharge Temperature Calibration | Set the discharge temperature calibration offset.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Return Temperature Calibration    | Set the return temperature calibration offset.                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 8: Inputs Configuration Table

UI1 is not configurable but is factory-assigned to CO2 sensing.

## Outputs Configuration

All valves and fan configuration parameters are found in the **Outputs Configuration** subsection.

The screenshot shows the 'Outputs Configuration' subsection with the following settings:

- Cooling Valve Type: Unused
- Cooling Valve Direction: NormClose
- Heating Valve Type: Unused
- Heating Valve Direction: NormClose
- Fan Type: varSpeed
- Damper Control: 0-10V

Figure 34: Outputs Configuration subsection

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

| Parameter            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cool Valve Type      | <p><b>Unused</b> – The valve is not used.</p> <p><b>0-10V</b> – If the fan is not configured for VarSpeed, AO7 is used to control the cooling valve. If the fan is configured for VarSpeed and the damper is configured, AO8 is used to control the cooling valve.</p> <p><b>Thermal</b> – DO5 is used to control the thermal.</p> <p><b>On-Off</b> – DO5 is used to control the digital valve.</p> <p><b>Floating</b> – DO5 and DO6 (DO5 = Open, DO6 = Close) are used to control the Floating valve.</p>                                                      |
| Cool Valve Direction | <p>Select the cooling valve polarity:</p> <p><b>Normally open</b></p> <p><b>Normally closed</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Heat Valve Type      | <p><b>Unused</b> – The valve is not used.</p> <p><b>0-10V</b> – If the damper is not configured, AO8 is used to control the heating valve. If the damper is configured and the fan is not configured for VarSpeed and the Cooling Valve is not configured for 0-10V, AO7 is used to control the heating valve.</p> <p><b>Thermal</b> – DO9 is used to control the thermal valve.</p> <p><b>On-Off</b> – DO9 is used to control the digital valve.</p> <p><b>Floating</b> – DO9 and DO10 (DO9 = Open, DO10 = Close) are used to control the Floating valve .</p> |
| Heat Valve Direction | <p>Select the heating valve polarity:</p> <p><b>Normally open</b></p> <p><b>Normally closed</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Fan Type             | <p><b>noFan</b> – The system is not equipped with fan control.</p> <p><b>1 Speed</b> – The system is equipped with a 1 speed fan.</p> <p><b>2 Speed</b> – The system is equipped with a 2 speed fan.</p> <p><b>3 Speed</b> – The system is equipped with a 3 speed fan.</p> <p><b>VarSpeed</b> – The system is equipped with a variable fan speed.</p>                                                                                                                                                                                                          |
| Floating drive time  | <p>Enter here the drive time in seconds of the floating valve when either Cool Valve Type or Heat Valve Type is set to Floating.</p>                                                                                                                                                                                                                                                                                                                                                                                                                            |

## Room Sensors

Allure EC-Smart-View and Allure EC-Smart-Comfort or EC-Smart-Air configuration parameters are found in the Room Sensors subsection of the Hardware Configuration tab.

**Room Sensors**

EC-Smart-View CO<sub>2</sub> Display enable: Disable

EC-Smart-View Display: SpaceTemp

EC-Smart-View Permissions: Full\_Access

EC-Smart-View Units: deg.C

Elevation: 0 m

EC-Smart-Comfort/Air Sensor Sleep Time: 0 s

EC-Multi-Sensor Zone: 0

Figure 35: Room Sensor subsection

| Parameter                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EC-Smart-View CO <sub>2</sub> Display enable | Select whether the EC-Smart-View CO <sub>2</sub> Display is <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                                                                                                                                                                                                                                           |
| EC-Smart-View Display                        | Select what will be displayed on the home screen of the EC-Smart-View:<br><b>SpaceTemp</b> : Displays the space temperature.<br><b>SpOffset</b> : Displays the setpoint offset.<br><b>MidSetpoint</b> : Displays the middle setpoint.<br><b>EffectSp</b> : Displays the effective setpoint.                                                                                                                                                                                                               |
| EC-Smart-View Permissions                    | Defines how much access a user of the Allure EC-Smart-View has to the controller's configuration parameters. The Allure EC-Smart-View 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.<br>Regardless of the access level of the Allure EC-Smart-View, the controller's configuration parameters cannot be modified through the Allure EC-Smart-View except after a password is entered. |
| EC-Smart-View Units                          | Displays the units being used for the EC-Smart-View.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Elevation                                    | For accurate CO <sub>2</sub> concentration levels, input geographic elevation here if elevation is greater than 500ft (152m) above sea level. By default, the sensor is factory calibrated to sea level.                                                                                                                                                                                                                                                                                                  |
| EC-Smart-Comfort/Air Sensor Sleep Time       | Enter the amount of time before the sensor goes into standby mode.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| EC-Multi-Sensor Zone                         | Set the designated zone of the multi-sensor to match the remote.<br>Zone <b>0</b> (zero) indicates that the sensor is zone free and can be accessed by any remote with any zone designation if it is within range.                                                                                                                                                                                                                                                                                        |

## HVAC Control

The **HVAC Control** tab allows a user to configure several parameters such as, setpoints, fan, discharge, and water temperature configuration parameters. A brief description of each type of configuration parameter is outlined below.

Figure 36: HVAC Control tab

### General

The **General Configuration** subsection lets the user select the type of system being used, as well as the change over delay time.

Figure 37: General HVAC subsection

| Parameter             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System Type           | <p><b>Twopipeclg</b> – 2 pipes cooling only.</p> <p><b>Twopipeclgelectheat</b> – 2 pipes cooling only with electric heater.</p> <p><b>Twopipehtg</b> – 2 pipes heating only.</p> <p><b>Twopipehtgelectheat</b> – 2 pipes heating only with electric heater.</p> <p><b>Twopipechgover</b> – 2 pipes change-over.</p> <p><b>Twopipechgoverelectheat</b> – 2 pipes change-over with electric heater.</p> <p><b>Fourpipe</b> – 4 pipes heating and cooling.</p> <p><b>Fourpipeelectheat</b> – 4 pipes heating and cooling with electric heater.</p> <p><b>Twopipe6wayvalve</b> – 2 pipes with a 6 way valve.</p> <p><b>Heatpumpunit</b> – Heat pump unit.</p> <p><b>Other</b> – Other system type</p> |
| Change Over Delay     | 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.                                                                                                                                                                                                                                                                                                                                                                                                               |
| Setpoint Offset Range | Input the range for the setpoint offset.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



## Setpoints

The **Setpoints Configuration** subsection contains the heating and cooling setpoints for the occupied, standby and unoccupied modes.

| Setpoints                   |                                 |    |
|-----------------------------|---------------------------------|----|
| Unoccupied Cool Setpoint:   | <input type="text" value="30"/> | °C |
| Standby Cool Setpoint:      | <input type="text" value="28"/> | °C |
| Occupied Cool Setpoint:     | <input type="text" value="26"/> | °C |
| Occupied Heat Setpoint:     | <input type="text" value="19"/> | °C |
| Standby heat Setpoint:      | <input type="text" value="17"/> | °C |
| Unoccupied Heat Setpoint:   | <input type="text" value="15"/> | °C |
| Freeze protection setpoint: | <input type="text" value="8"/>  | °C |

Figure 38: Setpoints configuration subsection

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

## HVAC Scaling

The **HVAC Scaling** subsection contains cooling and heating load values for fully open and fully closed valves.

| Hvac Scaling             |                                  |   |
|--------------------------|----------------------------------|---|
| Minimum cooling valve:   | <input type="text" value="0"/>   | % |
| Maximum cooling valve:   | <input type="text" value="0"/>   | % |
| Minimum heating valve:   | <input type="text" value="0"/>   | % |
| Maximum heating valve:   | <input type="text" value="50"/>  | % |
| Minimum Electric Heater: | <input type="text" value="50"/>  | % |
| Maximum Electric Heater: | <input type="text" value="100"/> | % |

Figure 39: HVAC Scaling Subsection

| Parameter               | Description                                                  |
|-------------------------|--------------------------------------------------------------|
| Minimum cooling valve   | Input the cooling load value for 0% cooling valve opening.   |
| Maximum cooling valve   | Input the cooling load value for 100% cooling valve opening. |
| Minimum heating valve   | Input the heating load value for 0% heating valve opening.   |
| Maximum heating valve   | Input the heating load value for 100% heating valve opening. |
| Minimum electric heater | Input the heating load value for 0% electric heater.         |
| Maximum electric heater | Input the heating load value for 100% electric heater.       |

## Fan Configuration

The **Fan Configuration** subsection contains the fan type and fan mode configuration parameters.

**Fan Configuration**

|                                |               |   |
|--------------------------------|---------------|---|
| Fan Type:                      | varSpeed      | ▼ |
| Fan Control Mode:              | HVF_CON_CYCLE | ▼ |
| Maximum Fan in Cool mode:      | 100           | % |
| Fan high Rescale in cool mode: | 100           | % |
| Fan Low Rescale in cool mode:  | 0             | % |
| Maximum Fan in heat mode:      | 100           | % |
| Fan high rescale in heat mode: | 100           | % |
| Fan Low rescale in heat mode:  | 0             | % |
| Fan Off Delay:                 | 120           | s |
| Minimum Variable Fan:          | 10            | % |

Figure 40: Fan Configuration subsection

| Parameter                     | Description                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fan Type                      | <b>noFan</b> – No fan<br><b>oneSpeed</b> – One speed fan.<br><b>twoSpeed</b> – Two speed fan.<br><b>threeSpeed</b> – Three speed fan.<br><b>varSpeed</b> – Variable speed fan.                                                                                                                                                                                     |
| Fan Control Mode              | Input the cooling load value for 0% cooling valve opening.                                                                                                                                                                                                                                                                                                         |
| Fan control Mode              | <b>HVF_CONTINUOUS</b> – Fan continuously operating<br><b>HVF_CYCLE</b> – Fan cycling based on heating/cooling load<br><b>HVF_CON_CYCLE</b> – Fan continuously operating in occupied mode and cycling during unoccupied periods<br><b>HVF_CYCLE_HEAT</b> – Fan cycling based on heating load only<br><b>HVF_CYCLE_COOL</b> – Fan cycling based on cooling load only |
| Maximum Fan in Cool mode:     | This configuration is used to set the maximum fan speed in cooling mode.                                                                                                                                                                                                                                                                                           |
| Fan high Rescale in cool mode | This configuration is used to set the cooling load at which the fan will be set to <b>Maximum Fan in Cool mode</b> .                                                                                                                                                                                                                                               |
| Fan low Rescale in cool mode  | This configuration is used to set the minimum cooling load required to start the fan operation algorithm.                                                                                                                                                                                                                                                          |
| Maximum Fan in heat mode      | This configuration is used to set the maximum fan speed in heating mode.                                                                                                                                                                                                                                                                                           |
| Fan high Rescale in heat mode | This configuration is used to set the heating load at which the fan will be set to <b>Maximum Fan in heat mode</b> .                                                                                                                                                                                                                                               |
| Fan low Rescale in heat mode  | This configuration is used to set the minimum heating load required to start the fan operation algorithm.                                                                                                                                                                                                                                                          |
| Fan off delay                 | Amount of time before the fan enters standby.                                                                                                                                                                                                                                                                                                                      |
| Minimum variable fan          | This configuration is used to set the minimum fan speed operation.                                                                                                                                                                                                                                                                                                 |

## Discharge Air Configuration

The **Discharge Air Configuration** subsection allows the user to adjust discharge air settings such as discharge air limits and setpoints.

**Discharge Air Configuration**

Discharge Air Limit Type:  ▼

Heating Discharge Air setpoint:  °C

Cooling Discharge Air Setpoint:  °C

Figure 41: Discharge Air Configuration subsection

| Parameter                      | Description                                                                                                                                                                                                                                                                      |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discharge Air Limit Type       | <b>notLimited</b> – No limits for discharge air temperature.<br><b>lowLimit</b> – Limit to cooling discharge air temperature.<br><b>highLimit</b> – Limit to heating discharge air temperature.<br><b>highLowLimit</b> – Limit to heating and cooling discharge air temperature. |
| Heating Discharge Air Setpoint | Enter the desired setpoint for heating discharge air. The duct heater is limited when the discharge air temperature reaches this setpoint.                                                                                                                                       |
| Cooling Discharge Air Setpoint | Enter the desired setpoint for cooling discharge air. The duct cooling is limited when the discharge air temperature reaches this setpoint.                                                                                                                                      |

## Water Temperature Configuration

The Water Temperature Configuration subsection allows the user to adjust heating and cooling water setpoints.

**Water Temperature Configuration**

Cool Water Setpoint:  °C

Heat Water setpoint:  °C

Figure 42: Water Temperature Configuration subsection

| Parameter           | Description                                   |
|---------------------|-----------------------------------------------|
| Cool Water Setpoint | Enter the desired setpoint for cooling water. |
| Heat Water Setpoint | Enter the desired setpoint for heating water. |

## Damper Configuration

The configuration assistant contains several configuration parameters that control the damper's behavior. For example, the damper type, position, and CO<sub>2</sub> setpoint can be set.

**▲ Damper Configuration**

Damper Type: 0-10V ▾

Minimum Damper Position in occupied mode: 10 %

Minimum Damper Position in standby mode: 5 %

Maximum Damper Position: 100 %

CO<sub>2</sub> Setpoint: 1,000 ppm

Free Cooling Enable: FALSE ▾

Figure 43: Damper Configuration subsection

| Parameter                                | Description                                                                                                                                                                        |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Damper Type                              | Set the desired damper signal type. Choose from <b>None</b> , <b>0-10V</b> , <b>2-10V</b> .                                                                                        |
| Minimum Damper Position in occupied mode | Enter the maximum damper position while in occupied mode.                                                                                                                          |
| Minimum Damper Position in standby mode  | Enter the minimum damper position while in standby mode.                                                                                                                           |
| Maximum Damper Position                  | Enter the overall maximum damper position..                                                                                                                                        |
| CO <sub>2</sub> Setpoint                 | Enter the CO <sub>2</sub> setpoint.                                                                                                                                                |
| Free Cooling Enable                      | Free cooling is when the damper opening is calculated according to maximum between CO <sub>2</sub> load and cooling load. Choose to enable (TRUE) or disable (FALSE) this feature. |

## Occupancy Configuration

The **Occupancy Configuration** tab allows the user to configure general occupancy settings. The table below provides a brief explanation of the available settings.

**▲ General**

Motion Hold Time: 15 s

Bypass Time: 60 min

Motion sensor source: DigitalInput ▾

Enable Room Unoccupied: Yes ▾

Figure 44: General Occupancy Configuration subsection

| Parameter              | Description                                                                                                                                                                                                                                                                                                                             |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motion Hold Time       | Enter the amount of time the motion sensor is on hold after first being initiated.                                                                                                                                                                                                                                                      |
| Bypass Time            | The duration of time the controller remains in bypass mode when changed from standby or unoccupied modes.<br><br>In addition, if a motion sensor is present, the bypass mode override time represents how long the controller remains in occupied mode (no room occupancy is detected) before returning the controller to standby mode. |
| Motion sensor source   | <b>Unused</b> – No motion sensor is used.<br><b>Multi-Sensor</b> – EC-Multi-Sensor is used.<br><b>ComSensor</b> – Communicating sensor (EC-Smart-View) is used.<br><b>DigitalInput</b> – A digital input is used:<br><b>Auto/All</b> – Auto or all types are being used.                                                                |
| Enable Room Unoccupied | Select whether a room can be unoccupied.                                                                                                                                                                                                                                                                                                |

# Output Assignment

The Output Assignment tab indicates which physical outputs are assigned to the configured outputs based on the Outputs Configuration in the Hardware Configuration tab. This facilitates output wiring.

| General |                     |
|---------|---------------------|
| DO1:    | Fan Start           |
| DO2:    | Damper On/Off       |
| DO3:    | Unused              |
| DO4:    | Unused              |
| DO5:    | Cooling Valve Open  |
| DO6:    | Cooling Valve Close |
| AO7:    | variable Fan        |
| AO8:    | Damper 0-10V        |
| DO9:    | Heating Valve Open  |
| DO10:   | Heating Valve Close |

Figure 45: Outputs Assignments Subsection

## Saving to Multiple Devices

Save your settings to multiple devices by clicking on the save icon  in the Configuration Assistant menu ribbon. The Configuration Assistant Synchronization window will appear.

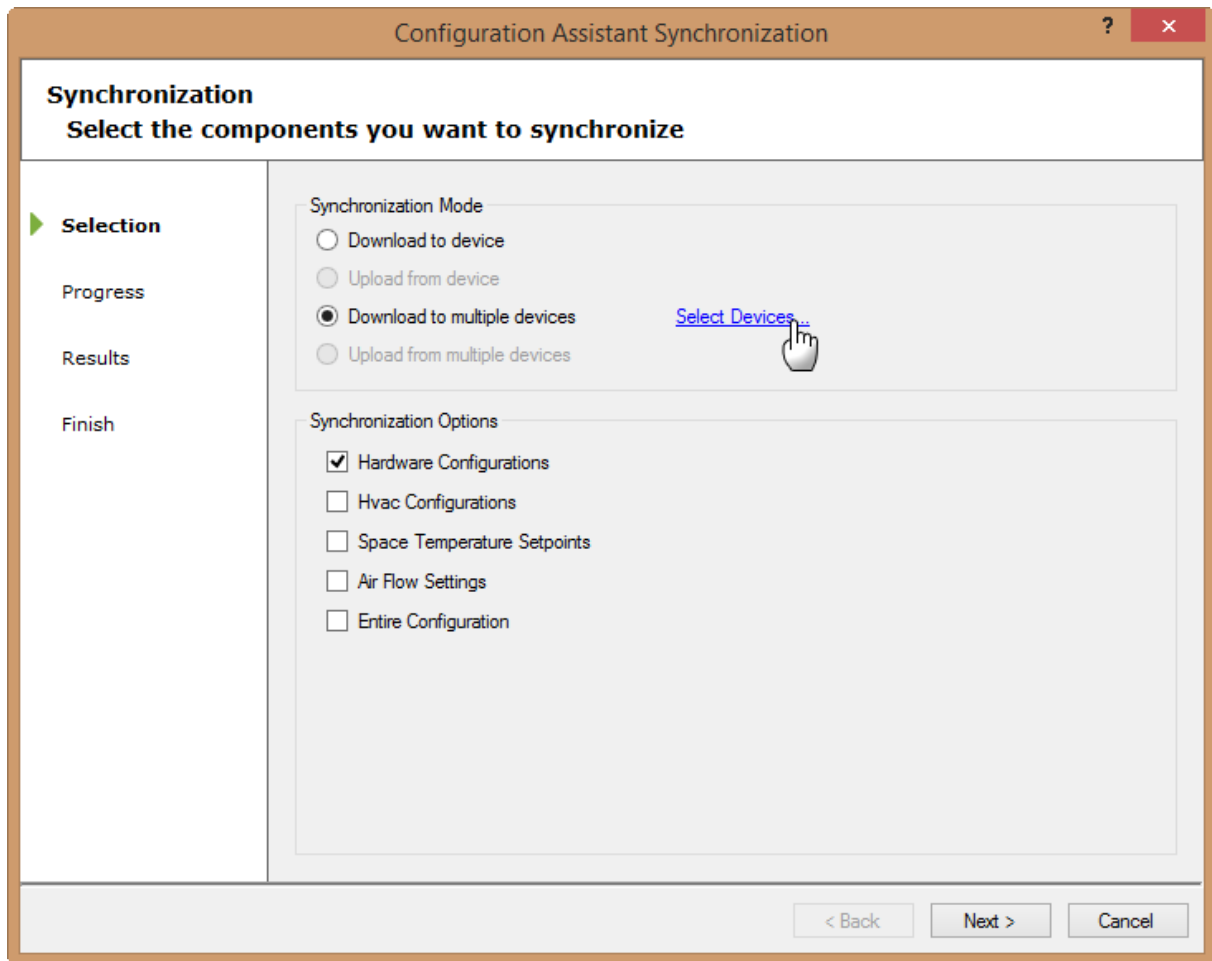


Figure 46: Configuration Assistant Synchronization window

You must select the other devices you wish to save the current configuration to, as well as selecting which parameters you wish saved to those controllers. Click next to advance and complete the process.

# Allure EC-Smart-Vue Screen-by-Screen Guide

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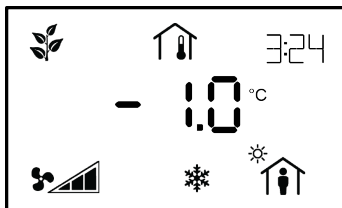
## Setting the home screen

Depending on the value of ComSensorDisplay (MSV29), the Allure EC-Smart-Vue sensor home screen will display either:

- ☐ the space temperature



- ☐ the setpoint offset



- ☐ the effective setpoint



- ☐ the average setpoint



## Configuration menus

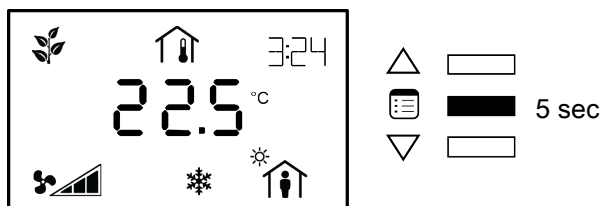
### Setting up the system configuration

This section is used to set the system configuration.

See the Enumeration tab section for more details.

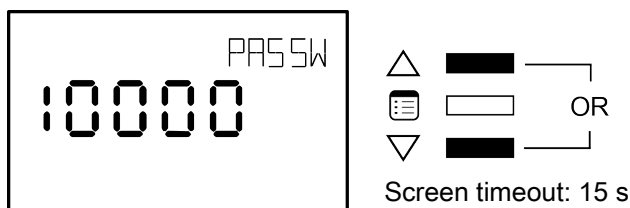
To enter the advanced menus:

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



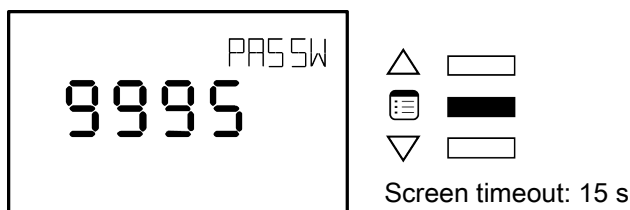
The password field appears.

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



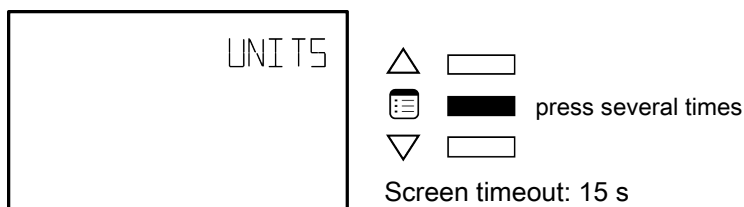
By default, the password is 9995.

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

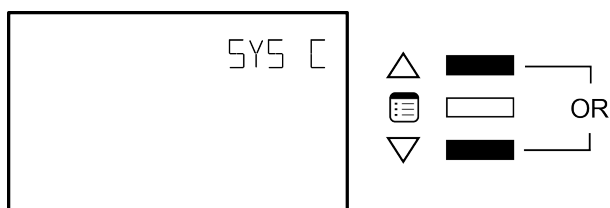


Upon submitting the correct password, the advanced menu is entered and the **Units** submenu is displayed.

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



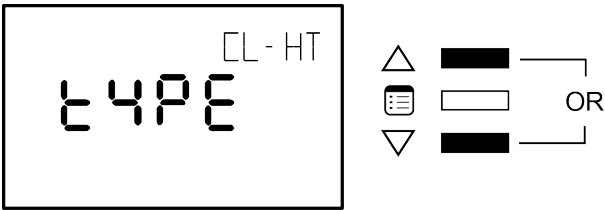
5. Press either of the arrow keys to enter the System Configuration submenu.





TYPE

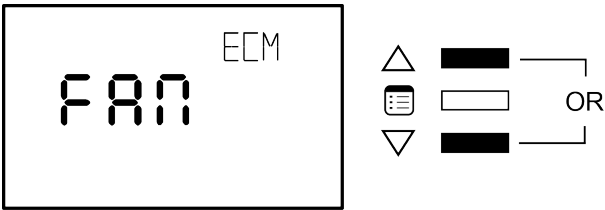
This menu is used to select the type of system (2 pipes, 4 pipes, etc.)



| Parameter     | Default | Valid Choices | Description |                                          |
|---------------|---------|---------------|-------------|------------------------------------------|
| TYPE<br>(EC6) |         | 0             | CL          | 2 Pipes cooling                          |
|               |         | 1             | CL-EH       | 2 Pipes cooling with electric heater     |
|               |         | 2             | HT          | 2 Pipes Heating                          |
|               |         | 3             | HT-EH       | 2 Pipes Heating with electric heater     |
|               |         | 4             | CO          | 2 Pipes Change Over                      |
|               |         | 5             | CO-EH       | 2 Pipes Change Over with electric heater |
|               | X       | 6             | CL-HT       | 4 Pipes                                  |
|               |         | 7             | CL-HT-EH    | 4 Pipes with electric heater             |

FAN

This menu is used to configure the fan type.

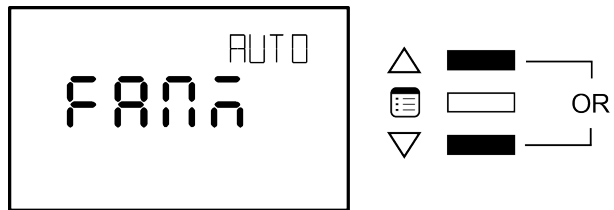


| Parameter       | Default | Valid Choices | Description |                          |
|-----------------|---------|---------------|-------------|--------------------------|
| FT<br>(nviFP39) |         | 0             | NONE        | Fan control is not used  |
|                 |         | 1             | 1 SP        | 1-Speed fan              |
|                 |         | 2             | 2 SP        | 2-speed fan              |
|                 |         | 3             | 3 SP        | 3-speed fan              |
|                 | X       | 4             | ECM         | ECM motor (0-10V output) |

Table 9: Fan Ctrl Type

**FANM**

This menu is used to configure the fan control mode.



| Parameter     | Default | Valid Choices |           | Description                                                                                                         |
|---------------|---------|---------------|-----------|---------------------------------------------------------------------------------------------------------------------|
| FAN (nviFP39) | X       | 0             | ON        | Fan is controlled between minimum speed and 100%                                                                    |
|               |         | 1             | AUTO      | Fan control is based on terminal load                                                                               |
|               |         | 2             | SMART     | Fan control is based on terminal load when unoccupied, and between minimum speed and 100% in other occupancy modes. |
|               |         | 3             | AUTO HEAT | Fan control is based on heating load                                                                                |
|               |         | 4             | AUTO COOL | Fan control is based on cooling load                                                                                |

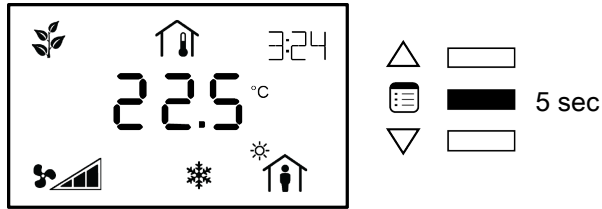
Table 10: Fan Mode

## Setting up Inputs

### Input Configuration

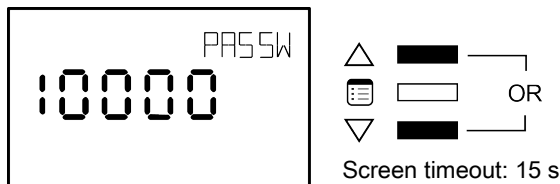
To enter the advanced menus:

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



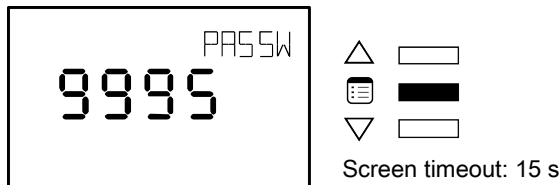
The password field appears.

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



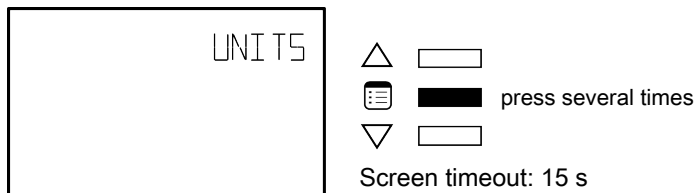
By default, the password is 9995.

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

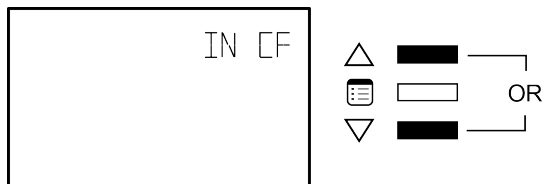


Upon submitting the correct password, the advanced menu is entered and the **Units** submenu is displayed.

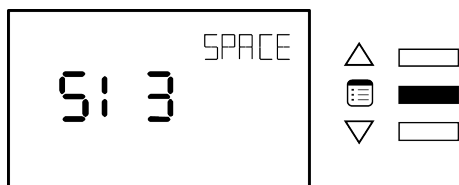
4. Press the **Menu** button several times until IN CFG appears on the display.



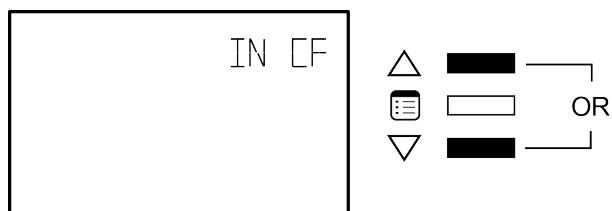
5. Press either of the arrow keys to enter the Inputs Configuration submenu.



6. Press the Menu button to navigate between the different submenus.



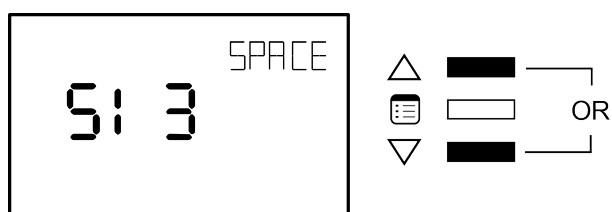
## UI2 - Input 2



| Parameter    | Default | Valid Choices |             | Description                                        |
|--------------|---------|---------------|-------------|----------------------------------------------------|
| UI2<br>(EC2) | X       | 0             | SP OFFSET   | Setpoint offset is connected to UI2                |
|              |         | 1             | DISCH TEMP  | Discharge temperature sensor is connected to UI2.  |
|              |         | 2             | RETURN TEMP | Return air temperature sensor is connected to UI2. |
|              |         | 3             | WATER TEMP  | Water Temperature sensor is connected to UI2.      |
|              |         | 4             | UNUSED      | UI2 is not used.                                   |

Table 11: Universal Input 2

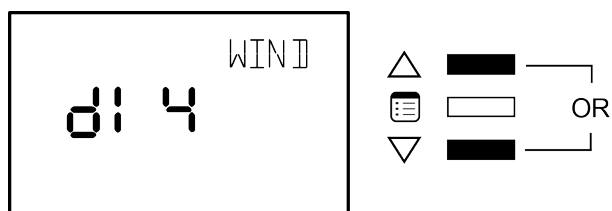
## SI3 - Input 3



| Parameter        | Default | Valid Choices |             | Description                                        |
|------------------|---------|---------------|-------------|----------------------------------------------------|
| SI3<br>(nviFP44) | X       | 0             | SPACE TEMP  | Space temperature sensor is connected to SI3       |
|                  |         | 1             | DISCH TEMP  | Discharge temperature sensor is connected to SI3.  |
|                  |         | 2             | RETURN TEMP | Return air temperature sensor is connected to SI3. |
|                  |         | 3             | WATER TEMP  | Water Temperature sensor is connected to SI3.      |
|                  |         | 4             | UNUSED      | SI3 is not used.                                   |

Table 12: Sensor Input 3

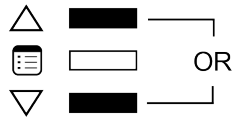
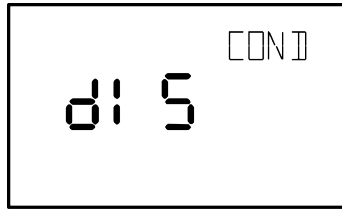
## DI4 - Input 4



| Parameter | Default | Valid Choices |           | Description                       |
|-----------|---------|---------------|-----------|-----------------------------------|
| DI4 (EC3) | X       | 0             | UNUSED    | DI4 is not used                   |
|           |         | 1             | WINDOW NO | Window Contact is normally open   |
|           |         | 2             | WINDOW NC | Window Contact is normally closed |

Table 13: Digital Input 4

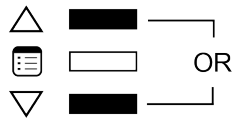
## DI5 - Input 5



| Parameter    | Default | Valid Choices |                | Description                                      |
|--------------|---------|---------------|----------------|--------------------------------------------------|
| DI5<br>(EC4) | X       | 0             | UNUSED         | DI5 is not used                                  |
|              |         | 1             | AUX CONT NO    | Auxiliary contact is normally open               |
|              |         | 2             | AUX CONT NC    | Auxiliary contact is normally closed             |
|              |         | 3             | CHG OVER HEAT  | Changeover contact ( TRUE = Heat / FALSE = Cool) |
|              |         | 4             | CHG OVER COOL  | Changeover contact (TRUE = Cool / FALSE = Heat)  |
|              |         | 5             | COND SENSOR NO | Condensation sensor is normally open             |
|              |         | 6             | COND SENSOR NC | Condensation sensor is normally close            |

Table 14: Digital Input 5

## DI6 - Input 6



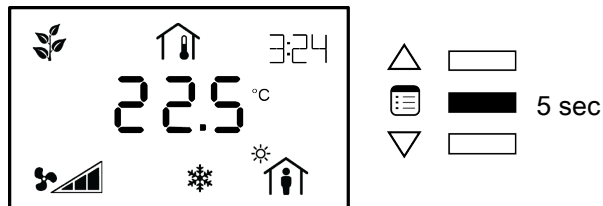
| Parameter    | Default | Valid Choices |               | Description                                      |
|--------------|---------|---------------|---------------|--------------------------------------------------|
| DI6<br>(EC5) |         | 0             | UNUSED        | DI5 is not used                                  |
|              | X       | 1             | AUX CONT NO   | Auxiliary contact is normally open               |
|              |         | 2             | AUX CONT NC   | Auxiliary contact is normally closed             |
|              |         | 3             | CHG OVER HEAT | Changeover contact ( TRUE = Heat / FALSE = Cool) |
|              |         | 4             | CHG OVER COOL | Changeover contact (TRUE = Cool / FALSE = Heat)  |
|              |         | 5             | OCC SENSOR NO | Occupancy sensor is normally open                |
|              |         | 6             | OCC SENSOR NC | Occupancy sensor is normally closed              |

Table 15: Digital Input 6

## Displaying Input Values

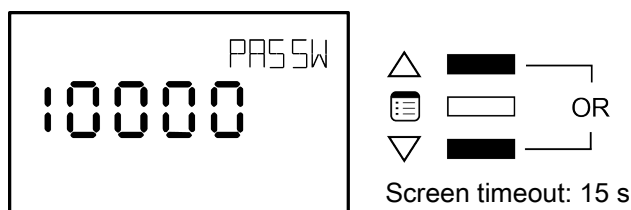
To enter the advanced menus:

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



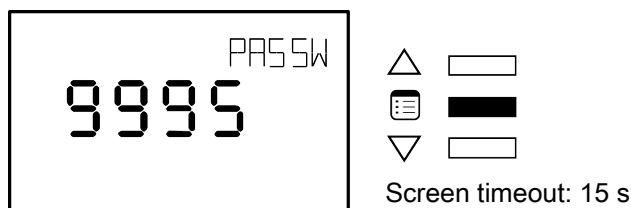
The password field appears.

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



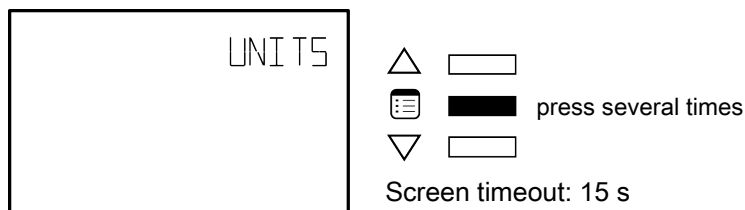
By default, the password is 9995.

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

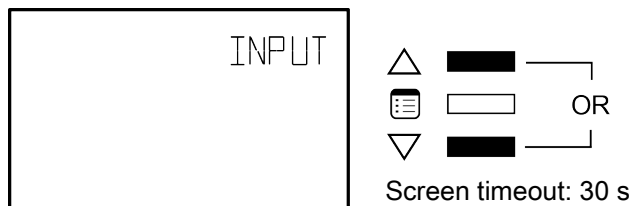


Upon submitting the correct password, the advanced menu is entered and the **Units** submenu is displayed.

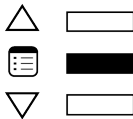
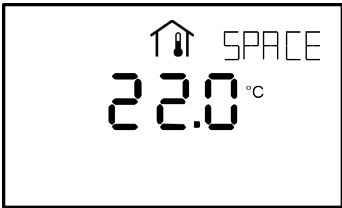
4. Press the **Menu** button several times until INPUTS appears on the display.



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



6. Press the Edit button to display successively the inputs values.



Screen timeout: 30 s

| Code  | Description                                                                                       |
|-------|---------------------------------------------------------------------------------------------------|
| UI1   | Displays UI1 value (volts)                                                                        |
| DISCH | Displays the actual discharge temperature value (-327°C if not configured or not connected)       |
| RETU  | Displays the actual return temperature value (-327°C if not configured or not connected)          |
| WATE  | Displays actual water temperature value (-327°C if not configured or not connected)               |
| SP OF | Displays setpoint offset from UI2.                                                                |
| SPAC  | Displays the actual space temperature value from SI3. (-327°C if not configured or not connected) |
| DI4   | Displays the actual state of DI4. (0 = Open, 1 = Close)                                           |
| DI5   | Displays the actual state of DI5. (0 = Open, 1 = Close)                                           |
| DI6   | Displays the actual state of DI6. (0 = Open, 1 = Close)                                           |

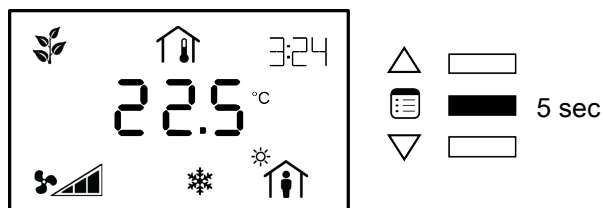
Table 16: Displaying Input Values

## Setting up Outputs

### Output Configuration

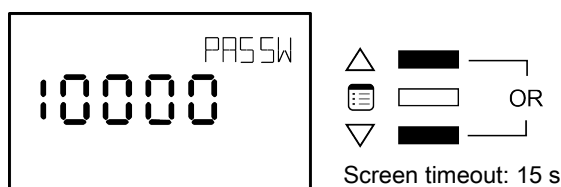
To enter the advanced menus:

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



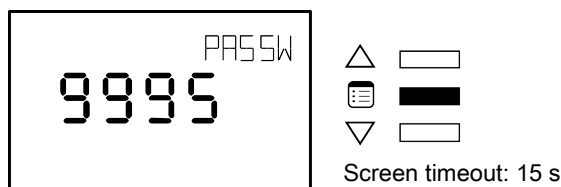
The password field appears.

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



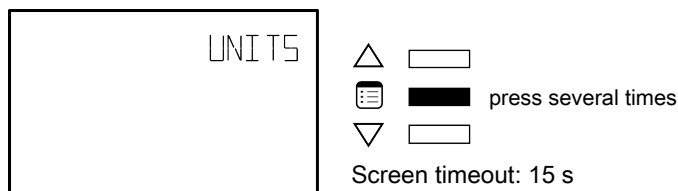
By default, the password is 9995.

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

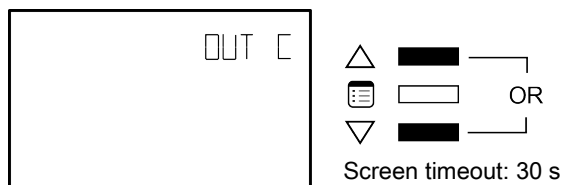


Upon submitting the correct password, the advanced menu is entered and the **Units** submenu is displayed.

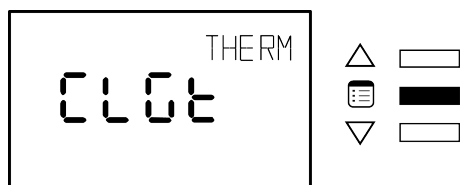
4. Press the **Menu** button several times until OUT CFG appears on the display.



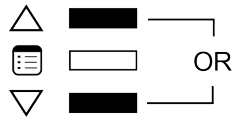
5. Press either of the arrow keys to enter the Outputs Configuration submenu.



6. Press the **Menu** button to navigate between the different submenus.

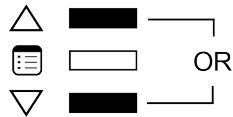




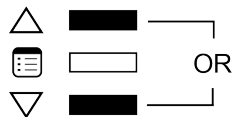
**CLG T - Cooling Valve Type**

| Parameter         | Default | Valid Choices | Description |
|-------------------|---------|---------------|-------------|
| CLG TYPE<br>(EC7) | X       | 0             | UNUSED      |
|                   |         | 1             | 0-10V       |
|                   |         | 2             | THERMAL     |
|                   |         | 3             | ON_OFF      |
|                   |         | 4             | FLOATING    |

Table 17: Cooling Valve Type

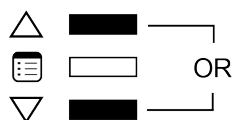
**CLG N - Cooling Valve Polarity**

Select Normally Open or Normally Closed depending on your system.

**HTG T - Heating Valve Type**

| Parameter         | Default | Valid Choices | Description |
|-------------------|---------|---------------|-------------|
| HTG TYPE<br>(EC8) | X       | 0             | UNUSED      |
|                   |         | 1             | 0-10V       |
|                   |         | 2             | THERMAL     |
|                   |         | 3             | ON_OFF      |
|                   |         | 4             | FLOATING    |

Table 18: Heating Valve Type

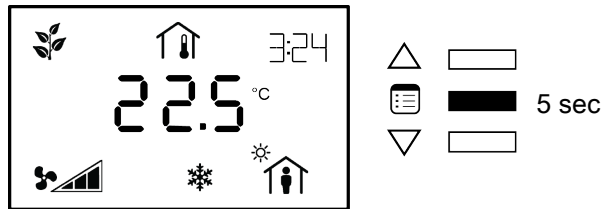
**HTG N - Heating Valve Polarity**

Select Normally Open or Normally Closed depending on your system.

## Equipment Override

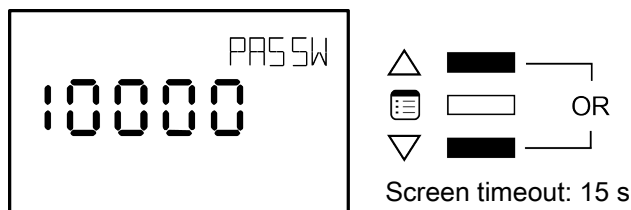
To enter the advanced menus:

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



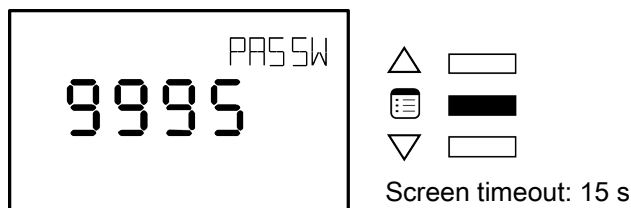
The password field appears.

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



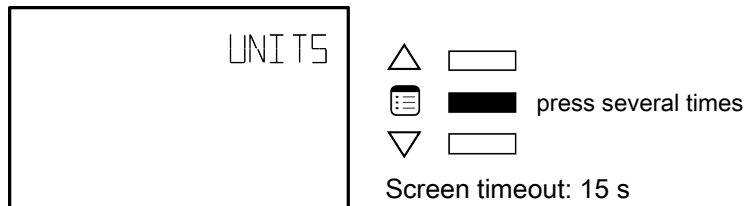
By default, the password is 9995.

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

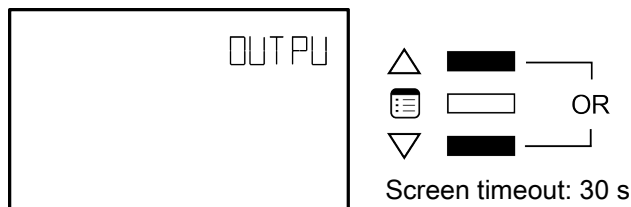


Upon submitting the correct password, the advanced menu is entered and the **Units** submenu is displayed.

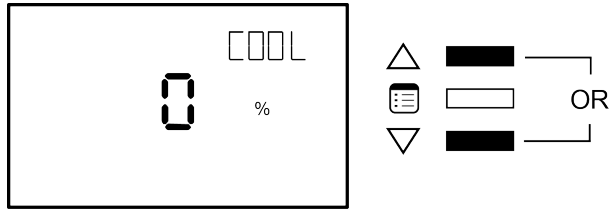
4. Press the **Menu** button several times until OUTPUTS appears on the display.



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



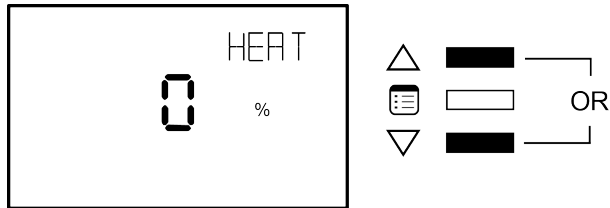
## Cooling or change over valve override



To go back to automatic control, press simultaneously both arrow keys.

Use the **arrow keys** to change the value and press the **Menu** button to validate.

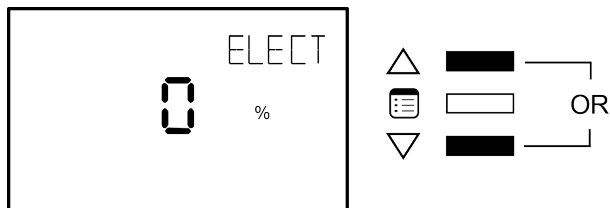
## Heating Valve Override



To go back to automatic control, press simultaneously both arrow keys.

Use the **arrow keys** to change the value and press the **Menu** button to validate.

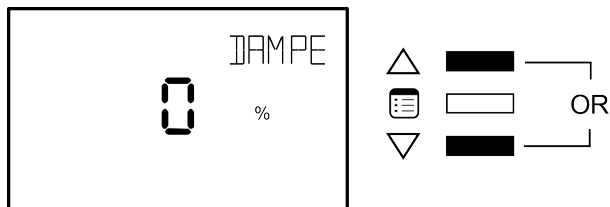
## Electric Heater Override



Use the **arrow keys** to change the value and press the **Menu** button to validate.

To go back to automatic control, press simultaneously both arrow keys.

## Damper Override



Use the **arrow keys** to change the value and press the **Menu** button to validate.

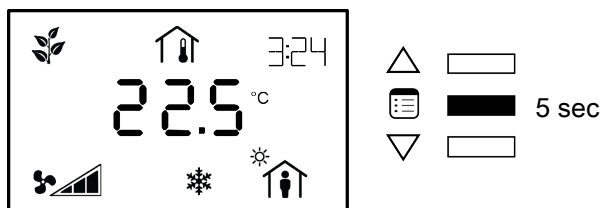
To go back to automatic control, press simultaneously both arrow keys.

## Setting up the network parameters and calibrating the system

### *Setting up the communication network parameters*

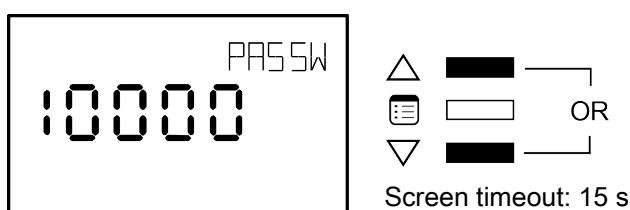
To enter the advanced menus:

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



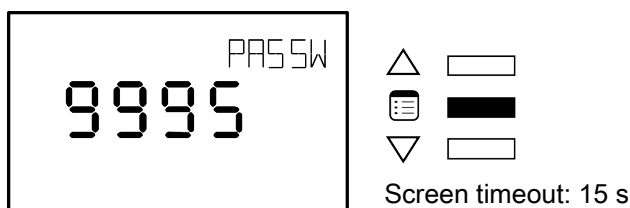
The password field appears.

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



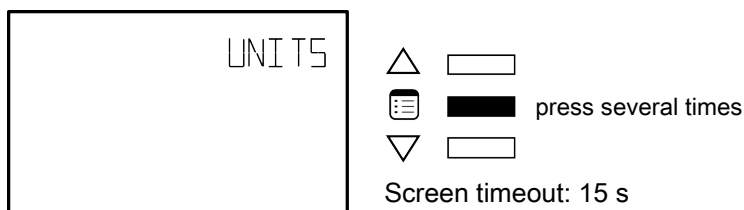
By default, the password is 9995.

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

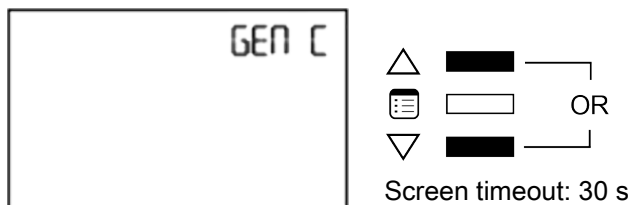


Upon submitting the correct password, the advanced menu is entered and the **Units** submenu is displayed.

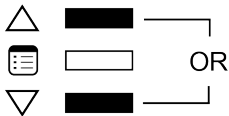
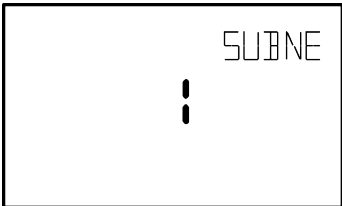
4. Press the **Menu** button several times until GEN CFG appears on the display.



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



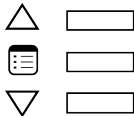
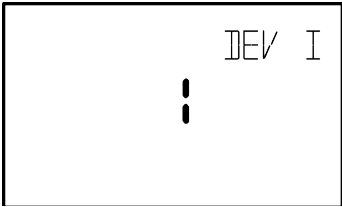
Subnet ID



Screen timeout: 30 s

Use the **arrow keys** to change the value and press the **Menu** button to validate.

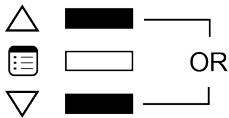
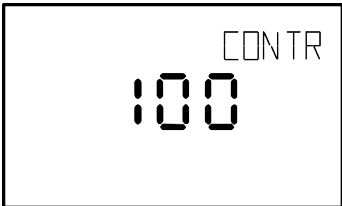
Device ID



Screen timeout: 30 s

The device ID is a read only value.

Screen Contrast



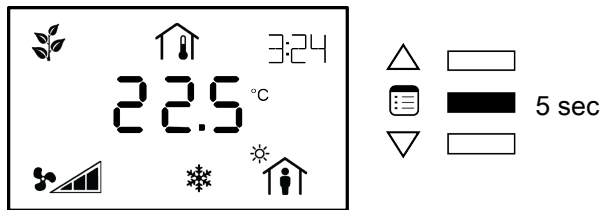
Screen timeout: 30 s

Use the **arrow keys** to change the value and press the **Menu** button to validate.

## Calibrating the system

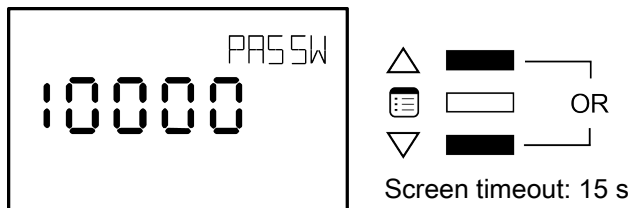
To enter the advanced menus:

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



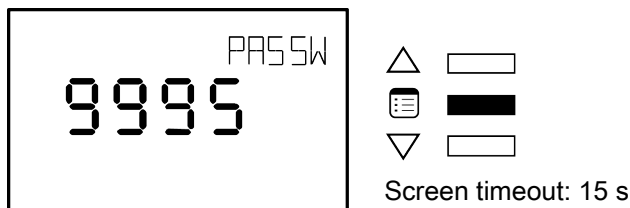
The password field appears.

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



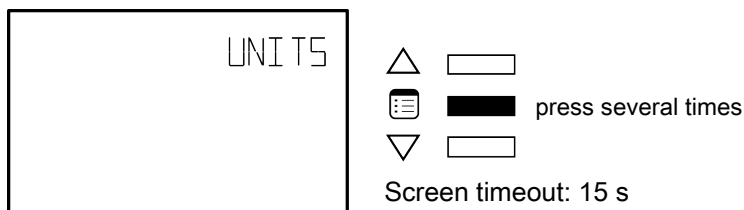
By default, the password is 9995.

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

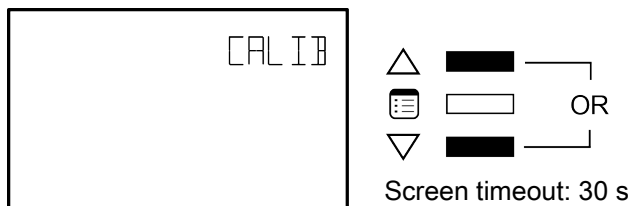


Upon submitting the correct password, the advanced menu is entered and the **Units** submenu is displayed.

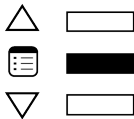
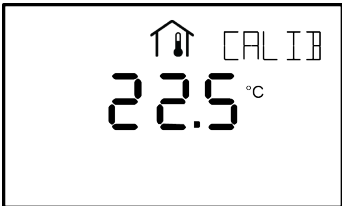
4. Press the **Menu** button several times until CALIBRATION appears on the display.



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

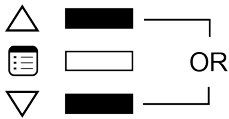
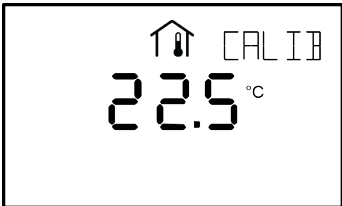


6. Press the Menu button to navigate between the different submenus.



Screen timeout: 30 s

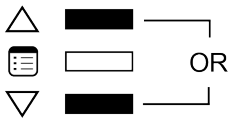
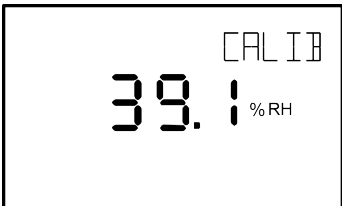
Temperature sensor calibration



Screen timeout: 30 s

Use the **arrow keys** to change the value and press the **Menu** button to validate.

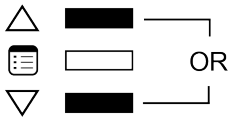
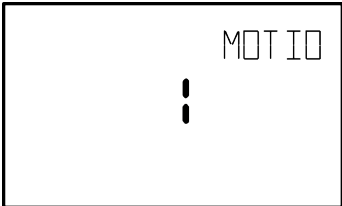
RH sensor calibration



Screen timeout: 30 s

Use the **arrow keys** to change the value and press the **Menu** button to validate.

Motion sensitivity



Screen timeout: 30 s

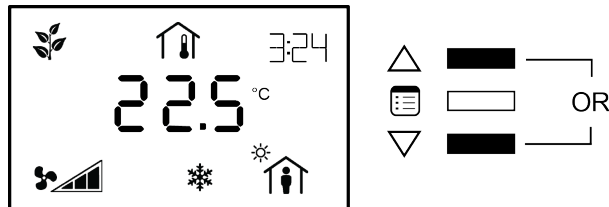
Use the **arrow keys** to change the value and press the **Menu** button to validate.

## End-User Overrides

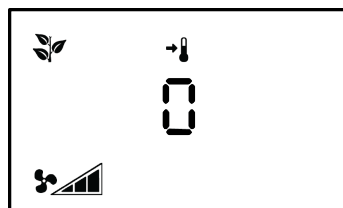
### Setpoint Offset Control

Using the Allure EC-Smart-Vue sensor, the user can change the setpoint offset. The setpoint offset range can be configured via SpOffsetRange

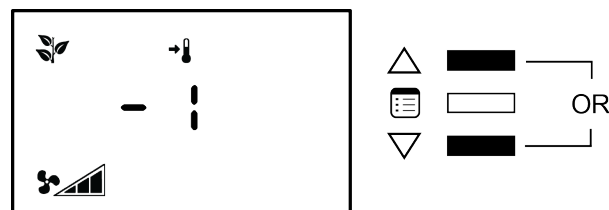
1. Press the up or down buttons to access the setpoint offset screen.



This Screen appears (Timeout 5 seconds).



2. Use the up and down buttons to change the setpoint offset. (+- 0.1 Increments)



### Occupancy Override

The first press to the **Menu** button switches the room occupancy from unoccupied to occupied.



The occupancy override by the **Allure EC-Smart-Vue** sensor is only used to set the room occupancy in occupied mode if the effective occupancy is currently in standby or unoccupied.

If the effective occupancy is Occupied, the Menu button is only used to set the fan speed.



## Fan Speed Override

Pressing the Menu button will change the fan speed (variable or 3 speed). The fan override is disabled when the room occupancy is not occupied.



| Icon | Description                         |
|------|-------------------------------------|
|      | Fan is overridden to low speed      |
|      | Fan is overridden to medium speed.  |
|      | Fan is overridden to maximum speed. |
|      | Fan is manually stopped.            |

Table 19: Fan Override Icons

# Tables of configuration codes

## System Type

| Parameter     | Default | Valid Choices | Description |                                          |
|---------------|---------|---------------|-------------|------------------------------------------|
| TYPE<br>(EC6) |         | 0             | CL          | 2 Pipes cooling                          |
|               |         | 1             | CL-EH       | 2 Pipes cooling with electric heater     |
|               |         | 2             | HT          | 2 Pipes Heating                          |
|               |         | 3             | HT-EH       | 2 Pipes Heating with electric heater     |
|               |         | 4             | CO          | 2 Pipes Change Over                      |
|               |         | 5             | CO-EH       | 2 Pipes Change Over with electric heater |
|               | X       | 6             | CL-HT       | 4 Pipes                                  |
|               |         | 7             | CL-HT-EH    | 4 Pipes with electric heater             |

## Fan Type

| Parameter       | Default | Valid Choices | Description |                          |
|-----------------|---------|---------------|-------------|--------------------------|
| FT<br>(nviFP39) |         | 0             | NONE        | Fan control is not used  |
|                 |         | 1             | 1 SP        | 1-Speed fan              |
|                 |         | 2             | 2 SP        | 2-speed fan              |
|                 |         | 3             | 3 SP        | 3-speed fan              |
|                 | X       | 4             | ECM         | ECM motor (0-10V output) |

Table 20: Fan Ctrl Type

## Fan Mode

| Parameter     | Default | Valid Choices | Description |                                                                                                                     |
|---------------|---------|---------------|-------------|---------------------------------------------------------------------------------------------------------------------|
| FAN (nviFP39) |         | 0             | ON          | Fan is controlled between minimum speed and 100%                                                                    |
|               |         | 1             | AUTO        | Fan control is based on terminal load                                                                               |
|               | X       | 2             | SMART       | Fan control is based on terminal load when unoccupied, and between minimum speed and 100% in other occupancy modes. |
|               |         | 3             | AUTO HEAT   | Fan control is based on heating load                                                                                |
|               |         | 4             | AUTO COOL   | Fan control is based on cooling load                                                                                |

Table 21: Fan Mode

## Cooling Valve Type

| Parameter         | Default | Valid Choices |          | Description                               |
|-------------------|---------|---------------|----------|-------------------------------------------|
| CLG TYPE<br>(EC7) |         | 0             | UNUSED   | Cooling valve is not used                 |
|                   | X       | 1             | 0-10V    | 0-10V cooling valve only is used          |
|                   |         | 2             | THERMAL  | Thermal and 0-10V cooling valve are used  |
|                   |         | 3             | ON_OFF   | On/Off and 0-10V cooling valve are used   |
|                   |         | 4             | FLOATING | Floating and 0-10V cooling valve are used |

Table 22: Cooling Valve Type

## Heating Valve Type

| Parameter         | Default | Valid Choices |          | Description                           |
|-------------------|---------|---------------|----------|---------------------------------------|
| HTG TYPE<br>(EC8) |         | 0             | UNUSED   | Heating valve is not used             |
|                   | X       | 1             | 0-10V    | 0-10V heating valve only is used      |
|                   |         | 2             | THERMAL  | Thermal and 0-10V heat valve are used |
|                   |         | 3             | ON_OFF   | On/Off and 0-10V heat valve are used  |
|                   |         | 4             | FLOATING | Floating and 0-10V heat valve is used |

Table 23: Heating Valve Type

## Cooling Valve Polarity

| Parameter          | Default | Valid Choices |            | Description                      |
|--------------------|---------|---------------|------------|----------------------------------|
| CLG NO/NC<br>(EC5) | X       | 0             | NORM CLOSE | Cooling valve is normally closed |
|                    |         | 1             | NORME OPEN | Cooling valve is normally open   |

Table 24: Cooling Valve Polarity

## Heating Valve Polarity

| Parameter          | Default | Valid Choices |            | Description                      |
|--------------------|---------|---------------|------------|----------------------------------|
| HTG NO/NC<br>(BC4) | X       | 0             | NORM CLOSE | Heating valve is normally closed |
|                    |         | 1             | NORME OPEN | Heating valve is normally open   |

Table 25: Heating Valve Polarity

## Universal Input 2

| Parameter    | Default | Valid Choices |             | Description                                        |
|--------------|---------|---------------|-------------|----------------------------------------------------|
| UI2<br>(EC2) | X       | 0             | SP OFFSET   | Setpoint offset is connected to UI2                |
|              |         | 1             | DISCH TEMP  | Discharge temperature sensor is connected to UI2.  |
|              |         | 2             | RETURN TEMP | Return air temperature sensor is connected to UI2. |
|              |         | 3             | WATER TEMP  | Water Temperature sensor is connected to UI2.      |
|              |         | 4             | UNUSED      | UI2 is not used.                                   |

Table 26: Universal Input 2

## Sensor Input 3

| Parameter        | Default | Valid Choices |             | Description                                        |
|------------------|---------|---------------|-------------|----------------------------------------------------|
| SI3<br>(nviFP44) | X       | 0             | SPACE TEMP  | Space temperature sensor is connected to SI3       |
|                  |         | 1             | DISCH TEMP  | Discharge temperature sensor is connected to SI3.  |
|                  |         | 2             | RETURN TEMP | Return air temperature sensor is connected to SI3. |
|                  |         | 3             | WATER TEMP  | Water Temperature sensor is connected to SI3.      |
|                  |         | 4             | UNUSED      | SI3 is not used.                                   |

Table 27: Sensor Input 3

## Digital Input 4

| Parameter | Default | Valid Choices |           | Description                       |
|-----------|---------|---------------|-----------|-----------------------------------|
| DI4 (EC3) | X       | 0             | UNUSED    | DI4 is not used                   |
|           |         | 1             | WINDOW NO | Window Contact is normally open   |
|           |         | 2             | WINDOW NC | Window Contact is normally closed |

Table 28: Digital Input 4

## Digital Input 5

| Parameter    | Default | Valid Choices |                | Description                                      |
|--------------|---------|---------------|----------------|--------------------------------------------------|
| DI5<br>(EC4) | X       | 0             | UNUSED         | DI5 is not used                                  |
|              |         | 1             | AUX CONT NO    | Auxiliary contact is normally open               |
|              |         | 2             | AUX CONT NC    | Auxiliary contact is normally closed             |
|              |         | 3             | CHG OVER HEAT  | Changeover contact ( TRUE = Heat / FALSE = Cool) |
|              |         | 4             | CHG OVER COOL  | Changeover contact (TRUE = Cool / FALSE = Heat)  |
|              |         | 5             | COND SENSOR NO | Condensation sensor is normally open             |
|              |         | 6             | COND SENSOR NC | Condensation sensor is normally close            |

Table 29: Digital Input 5

## Digital Input 6

| Parameter    | Default | Valid Choices | Description   |                                                  |
|--------------|---------|---------------|---------------|--------------------------------------------------|
| DI6<br>(EC5) |         | 0             | UNUSED        | DI5 is not used                                  |
|              | X       | 1             | AUX CONT NO   | Auxiliary contact is normally open               |
|              |         | 2             | AUX CONT NC   | Auxiliary contact is normally closed             |
|              |         | 3             | CHG OVER HEAT | Changeover contact ( TRUE = Heat / FALSE = Cool) |
|              |         | 4             | CHG OVER COOL | Changeover contact (TRUE = Cool / FALSE = Heat)  |
|              |         | 5             | OCC SENSOR NO | Occupancy sensor is normally open                |
|              |         | 6             | OCC SENSOR NC | Occupancy sensor is normally closed              |

Table 30: Digital Input 6

# Tables of IO Assignments

## Fan Configuration

| nciFanSettings.FanC- Variable Fan<br>trlType (nviFP39) |        | FanSpeed1 | FanSpeed2 | FanSpeed3 |
|--------------------------------------------------------|--------|-----------|-----------|-----------|
| None                                                   | Unused | Unused    | Unused    | Unused    |
| 1Speed                                                 | Unused | DO1       | Unused    | Unused    |
| 2Speed                                                 | Unused | DO1       | DO2       | Unused    |
| 3Speed                                                 | Unused | DO1       | DO2       | DO3       |
| VarSpeed                                               | AO7    | DO1       | Unused    | Unused    |

## Electric Heater Configuration

| SystemType (EC6)  | Electric Heater Output |
|-------------------|------------------------|
| Cool              | Unused                 |
| CoolElectHeat     | DO4                    |
| ChgOver           | Unused                 |
| ChgOverElectHea   | DO4                    |
| Heat              | Unused                 |
| HeatElectHeat     | DO4                    |
| CoolHeat          | Unused                 |
| CoolHeatElectHeat | DO4                    |

## Damper Configuration

| DamperCtrlType (EnumCon-<br>stant9) | Damper Output |
|-------------------------------------|---------------|
| None                                | Unused        |
| 0-10V                               | AO8           |
| 2-10V                               | AO8           |

## Cooling Valve Configuration

| SystemType (EC6)                                           | CoolValveType<br>(EnumConstant7) | nciFanSettings.FanC-<br>trlType (nviFP39) | DamperCtrlType<br>(EnumConstant9) | Cooling Valve Output  |
|------------------------------------------------------------|----------------------------------|-------------------------------------------|-----------------------------------|-----------------------|
| Heat/HeatElectHeat<br>or<br>CoolHeat/<br>CoolHeatElectHeat | Unused                           | -                                         | -                                 | Unused                |
|                                                            | 0-10V                            | VarSpeed                                  | None                              | AO8                   |
|                                                            |                                  | None or 3Speed                            | 0-10V or 2-10V                    | Invalid Configuration |
|                                                            | Thermal                          | -                                         | -                                 | AO7                   |
|                                                            | On/Off                           | -                                         | -                                 | DO5                   |
|                                                            | Floating                         | -                                         | -                                 | DO5                   |
| Any other settings                                         | -                                | -                                         | -                                 | DO5:Open, DO6:Close   |
|                                                            |                                  |                                           |                                   | Unused                |

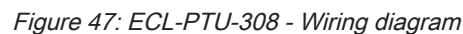
## Heating Valve Configuration

| SystemType (EC6)                                 | HeatValveType (EnumConstant8) | CoolValveType (EnumConstant7) | nciFanSettings.FanCtrlType (nviFP39) | DamperCtrlType (EnumConstant9) | Heating Valve Output  |
|--------------------------------------------------|-------------------------------|-------------------------------|--------------------------------------|--------------------------------|-----------------------|
| Heat/HeatElectHeat or CoolHeat/CoolHeatElectHeat | Unused                        | -                             | -                                    | -                              | Unused                |
|                                                  | 0-10V                         | 0-10V                         | VarSpeed                             | -                              | Invalid Configuration |
|                                                  |                               |                               | None or 3Speed                       | None                           | AO8                   |
|                                                  |                               | Not 0-10V                     | VarSpeed                             | 0-10V or 2-10V                 | Invalid Configuration |
|                                                  |                               |                               |                                      | None                           | AO8                   |
|                                                  |                               |                               | None or 3Speed                       | 0-10V or 2-10V                 | Invalid Configuration |
|                                                  |                               |                               |                                      | None                           | AO8                   |
|                                                  | Thermal                       | -                             | -                                    | -                              | AO7                   |
|                                                  | On/Off                        | -                             | -                                    | -                              | DO9                   |
| Any other settings                               | Floating                      | -                             | -                                    | -                              | DO9:Open, DO10:Close  |
|                                                  | -                             | -                             | -                                    | -                              | Unused                |

## Change-Over Valve Configuration

| SystemType (EC6)            | CoolValveType (EnumConstant7) | nciFanSettings.FanCtrlType (nviFP39) | DamperCtrlType (EnumConstant9) | Change-Over Valve     |
|-----------------------------|-------------------------------|--------------------------------------|--------------------------------|-----------------------|
| ChgOver or ChgOverElectHeat | Unused                        | -                                    | -                              | Unused                |
|                             | 0-10V                         | VarSpeed                             | None                           | AO8                   |
|                             |                               | None or 3Speed                       | 0-10V or 2-10V                 | Invalid Configuration |
|                             | Thermal                       | -                                    | -                              | AO7                   |
|                             | On/Off                        | -                                    | -                              | DO5                   |
|                             | Floating                      | -                                    | -                              | DO5                   |
| Any other settings          | -                             | -                                    | -                              | DO5:Open, DO6:Close   |
|                             | -                             | -                                    | -                              | Unused                |

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## Notes

1. SI3 input can be configured for SpaceTemp, ReturnTemp, WaterTemp or DischargeTemp sensor (10K Type II) using nciMiscConfig.SI3Config (nviFP44).  
UI2 Input can be configured for SetpointOffset (10K), ReturnTemp, Watertemp or DischargeTemp sensors (10K Type II) using UI2Config (EnumConstant2).
2. DI4 input can be configured for WindowContactNO or WindowContactNC using DI4Config (EnumConstant3).
3. DI5 input can be configured for AuxContactNO, AuxContactNC, ChgOverHeat, ChgOverCool, CondSensorNO or CondSensorNC using DI5Config (EnumConstant4).
4. DI6 input can be configured for AuxContactNO, AuxContactNC, ChgOverHeat, ChgOverCool, OccSensorNO or OccSensorNC using DI6Config (EnumConstant5).
5. This valve output is used for Change Over if SystemType (EC6) is set to ChgOver / ChgOver-ElecHeat.
6. 3-speed fan is used if nciFanSettings.FanCtrlType (nviFP39) is set to 3Speed.
7. Variable speed fan is used if nciFanSettings.FanCtrlType (nviFP39) is set to VarSpeed and AO7 control valve (cool or heat) if Fantype = None.
8. Fresh air damper control signal can be configured for 0-10V or 2-10V using DamperCtrlType (EnumConstant9) and AO8 control valve (cool or heat) if DamperCtrlType (EnumConstant9) = None.
9. Supports any version of EC-Multi-Sensor, Allure EC-Smart-View, Allure EC-Smart-Comfort and Allure EC-Smart-Air.
10. DO5 and DO9 outputs can be used to control a floating valve (heat, cooling or change Over) using HeatValveType (EnumConstant8) or CoolValveType (EnumConstant7) with DO5 = Open and DO6 = Closed.

