SIEMENS

Configuration of VAV Fan Powered Box for DOAS

A6V11786051
2019-07-15

Restricted

Building Technologies

Table of Contents

Before You Begin

Knowledge and Training Prerequisites

The reader / user of this document must be trained, knowledgeable, and familiar with using ABT Site to configure DXR automation stations.

See ABT Site Help for additional information as needed.

ABT Site & Hardware Requirements

The specific application configuration in this document was developed using:

- ABT Site 3.1.1 (with patch 3); Metaset 1153
- Custom developed .s1ca file provided by Siemens Chicago SWH
- DXR2.E18 must be used – no other DXR versions are supported

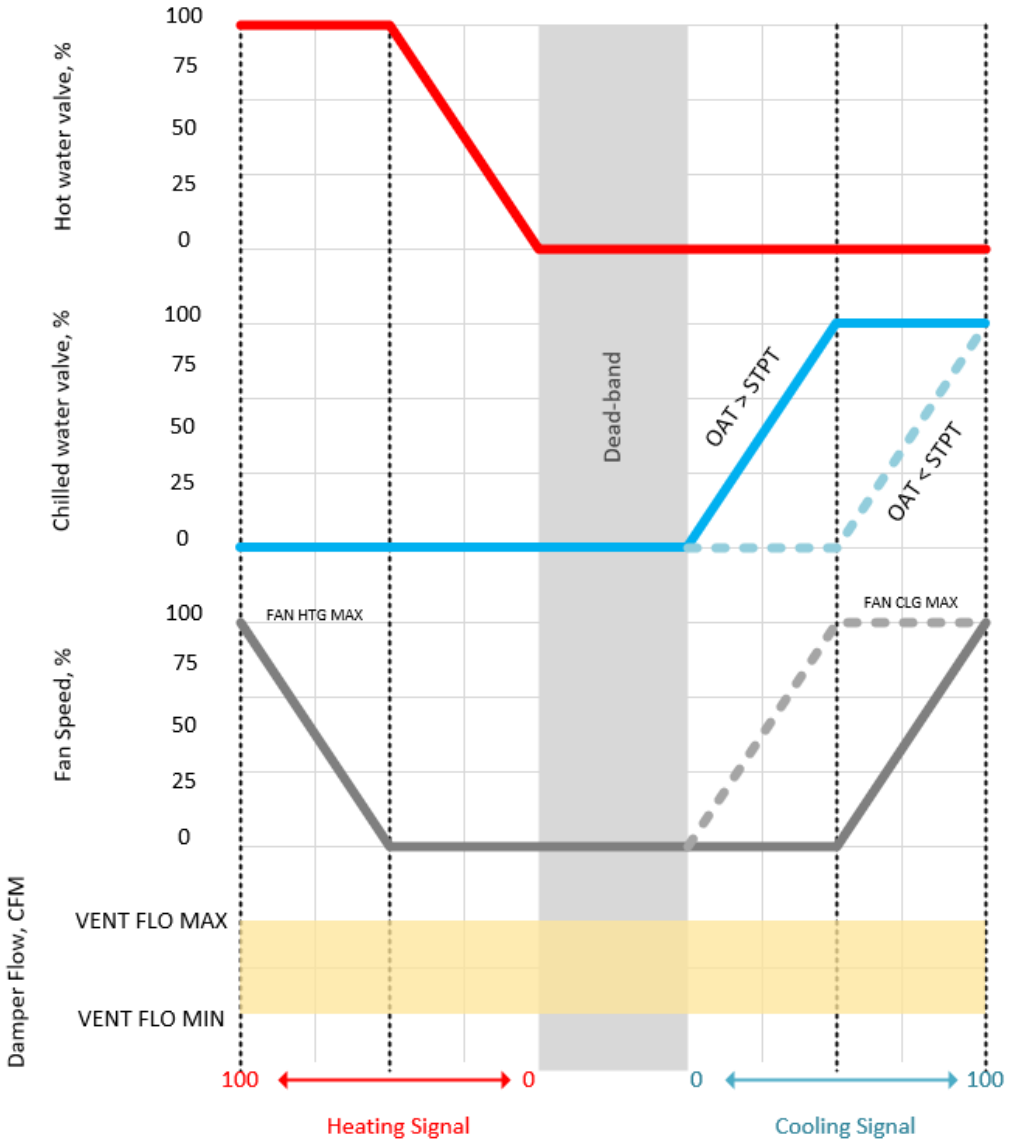
Scope and Purpose

This document provides configuration steps for engineering a Single Zone VAV RTU using a Desigo DXR2.E18 automation device. It is intended as a guide for those tasked with configuring and engineering Single Zone VAV RTU based projects using a custom Fan Powered Box application.

Configuration of VAV Fan Powered Box for DOAS

Sequence Diagram

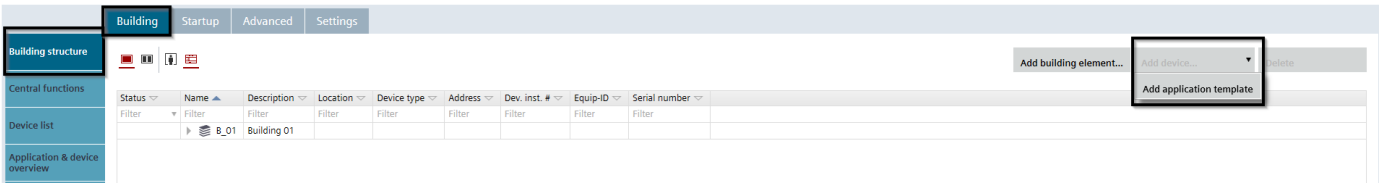
(See Appendix for written Sequence of Operation.)



1 – Import the Custom 'Type' to ABT Site

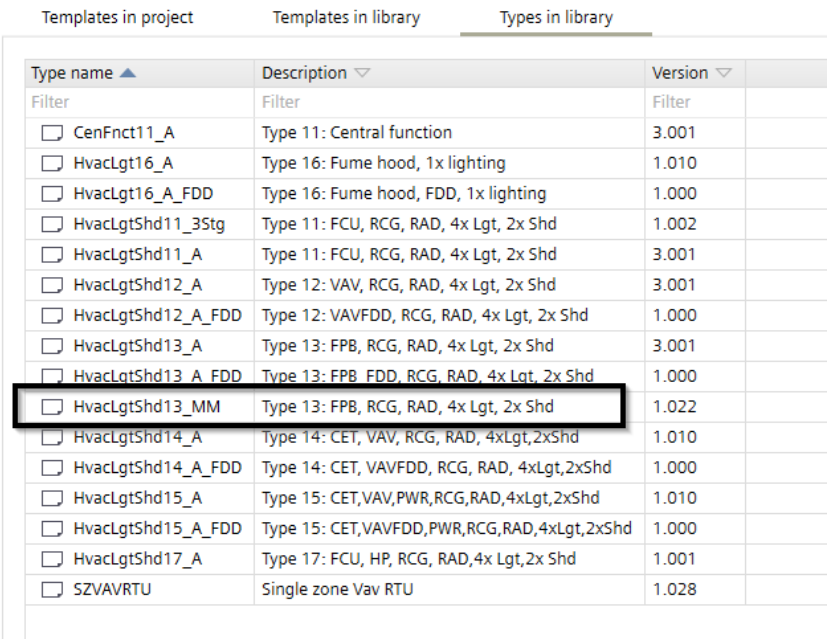
In ABT Site, navigate to the “Building Structure” Tab, and click the drop-down arrow next to “Add device”.

Select “Add application template”



Select “Import application type…” and navigate to the location of the .s1ca file to select and open.

Now select the Type":

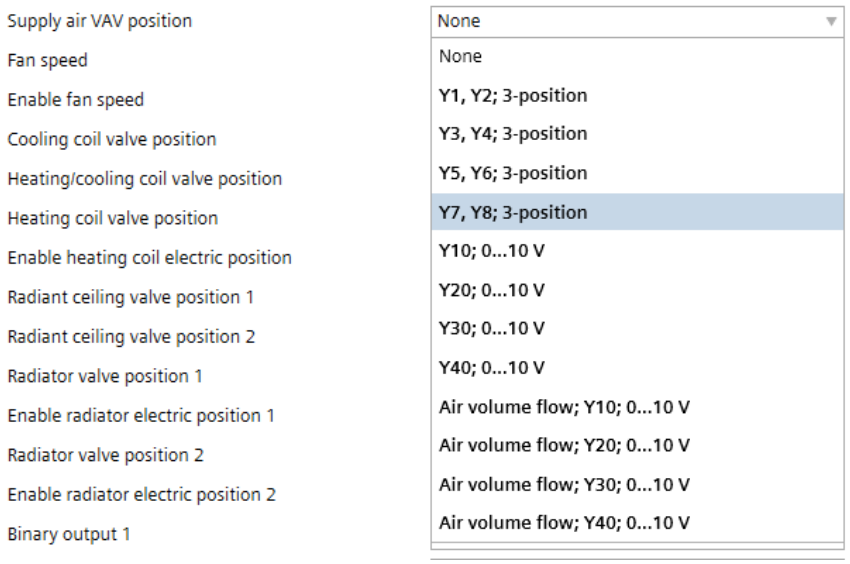


2 – ABT Site Application Configuration

Outputs

1) Supply air VAV Position

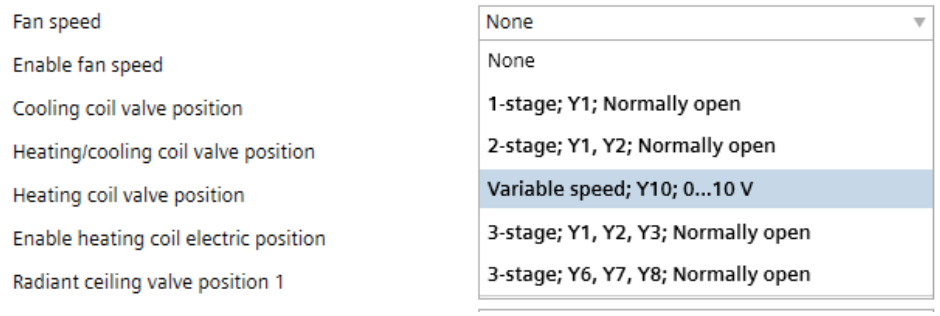
As a rule, 0-10Vdc actuators do not require any further configuration. If you select a 3-position actuator you will need to check the run-time to ensure the defined time matches, the actual actuator connected, the default time is 150 secs. The rise and fall times may need to both be defined/checked as indicated in the following diagram.



To add 'Additional parameters' to the Default values, Left click on Show/hide parameter... in the upper right of the Configuration Tab screen. Select %RSegm%, DAMPER POS, then ▼ Add and OK.

2) Fan Speed

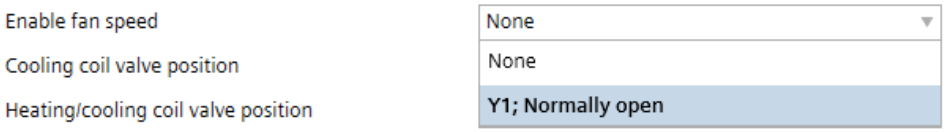
Many values for the fan speed in a FPB application MUST be configured in the Default Values tab. Properties such as the min and max speeds for cooling/heating/ventilation, the start and end speeds for the fan, and the flow from the VAV.



To add 'Additional parameters' to Default values, left click Show/hide parameter... and select %RSegm%, FAN VAR SPD.

3) Enable Fan Speed

As a rule, the 'Enable fan speed' output does not require any further configuration.

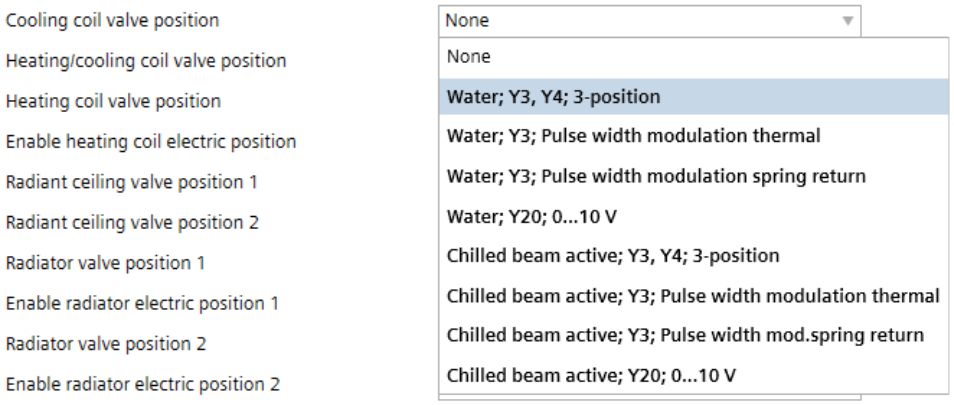


To add 'Additional parameters' to Default values, left click Show/hide parameter... and select %RSegm%, FAN ENABLE.

4) Cooling coil valve position

As a rule, 0-10Vdc actuators do not require any further configuration. If you select a 3-position actuator you will need to check the run-time to ensure the defined time matches, the actual actuator connected, the default time is 150 secs. The rise and fall times may need to both be defined/checked as indicated in the following diagram.

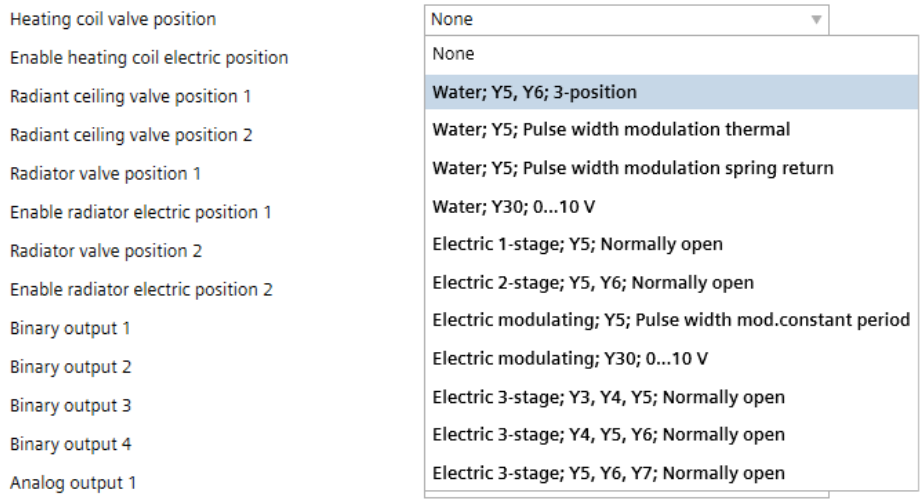
NOTE: If the condensation monitor is to be used correctly, "Chilled beam active…" must be chosen, as the chilled water applications do not have alarming logic for condensation in them.



To add 'Additional parameters' to Default values, left click Show/hide parameter... and select %RSegm%, CLG V POS.

5) Heating coil valve position

As a rule, 0-10Vdc actuators do not require any further configuration. If you select a 3-position actuator you will need to check the run-time to ensure the defined time matches, the actual actuator connected, the default time is 150 secs. The rise and fall times may need to both be defined/checked as indicated in the following diagram.

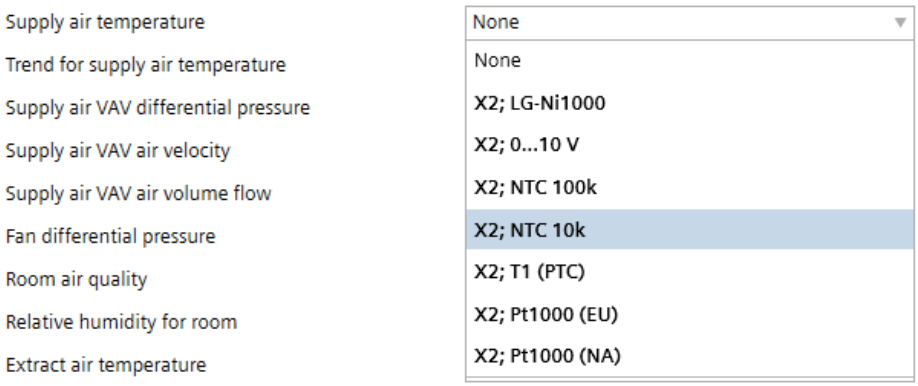


To add 'Additional parameters' to Default values, left click Show/hide parameter... and select %RSegm%, HTG V POS.

Inputs

1) Supply air temperature

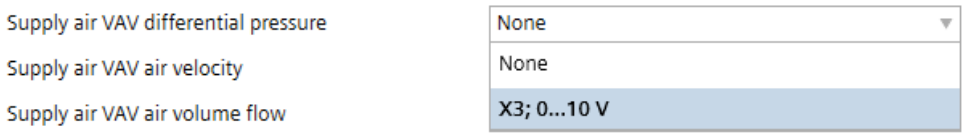
If unsure of what sensor has been used, then review the wiring diagrams to identify the type of sensor being used. The configurations are made in “Application configuration” part of ABT Site, and the parameters defined in the “Defined values” section of the template.



To add ‘Additional parameters’ to Default values, left click Show/hide parameter... and select %RSegm%, SLPY TEMP.

2) Supply air VAV differential pressure

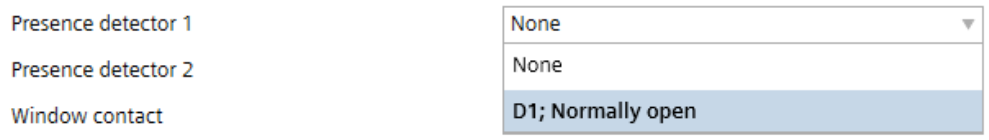
Select the differential pressure input using the on-board input selector.



To add ‘Additional parameters’ to Default values, left click Show/hide parameter... and select %RSegm%, SU DIFF P.

3) Presence detector

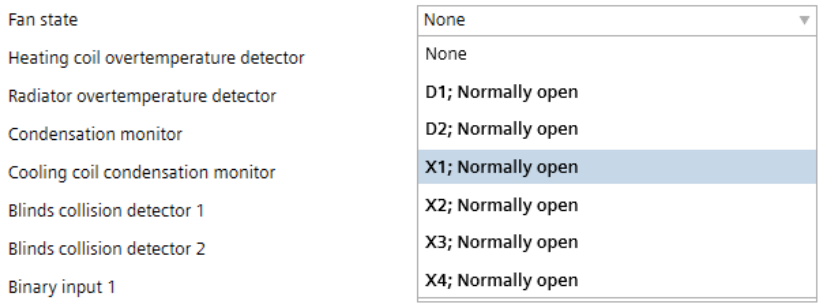
Select the presence detector input using the on-board input selector.



To add ‘Additional parameters’ to Default values, left click Show/hide parameter... and select %RSegm%, OCC SENSOR.

4) Fan state

Select the Fan State input using the on-board input selector.

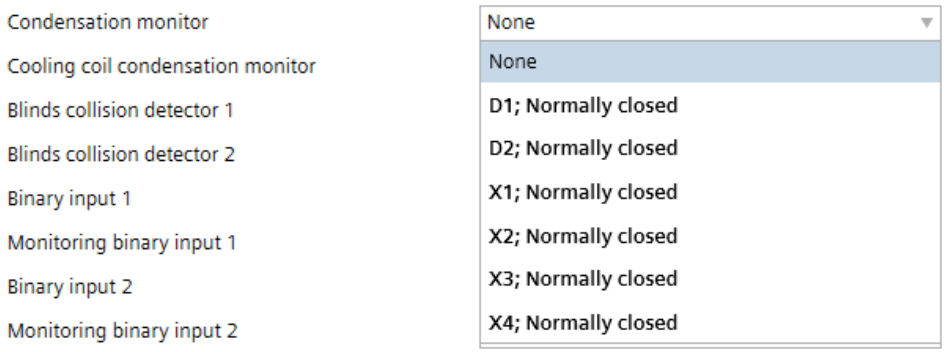


To add 'Additional parameters' to Default values, left click Show/hide parameter... and select %RSegm%, FAN STATUS.

5) Cooling coil condensation monitor

Select the cooling coil condensation monitor input using the on-board input selector.

NOTE: for proper sequencing with Chilled Water 13, "Cooling coil condensation monitor" must be chosen, NOT "Condensation monitor".

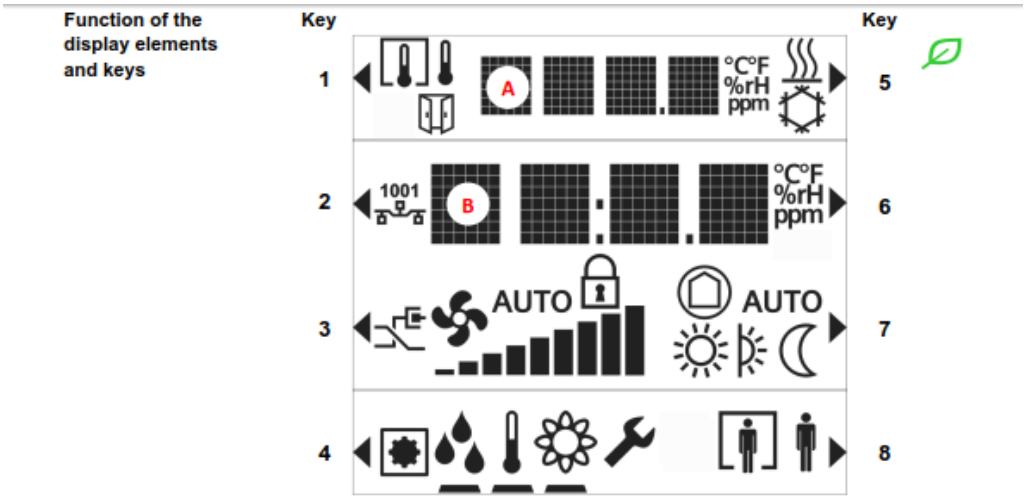


To add 'Additional parameters' to Default values, left click Show/hide parameter... and select %RSegm%, CND CL MON.

KNX PL-Link device (QMX3.P74)

Select the Room operator unit elements for display. The configurations are made in “Application configuration” part of ABT Site, and the parameters defined in the “Defined values” section of the template.

The **QMX3.P74** displays the selected information based on the figure:



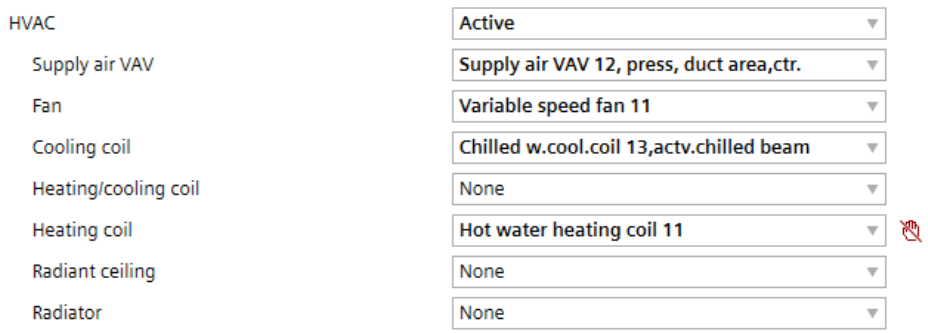
◀/▶	• An arrow indicates that an element can be operated
A °C°F %rH ppm	• Temperature display in °C or °F / humidity in % r.H. / air quality in text, symbol, or ppm of CO_2
◀ /	• Toggling (key 1) between indoor and outdoor measurement (temperature, humidity, CO2)
	• Indication that a window is open (connected window switch is active)
/	• Display of the plant state (Heating or Cooling / inactive) Note: No manual switchover! Key 5 is used for Green Leaf
	• Green Leaf function: Pressing key 5 activates the RoomOptiControl function.
◀ B °C°F %rH ppm ▶	• Display of the relative or absolute setpoint for temperature • Adjusting the setpoint using keys 2 and 6
◀ AUTO	• Display of the present fan speed (when automatic) • Adjusting the fan speed using key 3 (or keys 3 and 7 if operation of room operating mode is disabled)
AUTO ▶	• Display of the room operating mode (when automatic) • Adjusting the room operating mode using key 7
◀	• Navigation: toggle the display / setpoint setting between temperature / humidity / CO_2, using key 4. The black bar points to the displayed information.
/ ▶	• Operation of the occupancy state (presence switch, Comfort prolongation) • Activate the Comfort prolongation using key 8 (only available if enabled)
	• Indicates that the room operator unit is locked by the system. – Operation is disabled – The display in line 1 shows the temperature from bus

Default values for KNX PL-Link Devices(QMX3.P74)

	KNX PL-Link device				
☑	Room operator unit 1	Room unit, display temperature	Display room temperature		RM UNIT ST17
☑	**Room operator unit 1**	**Room unit, display humidity**	**Display room humidity**		**RM UNIT ST17**
☐	Room operator unit 1	Room unit, display windows status	No		RM UNIT ST17
☑	**Room operator unit 1**	**Room unit, display air quality**	**Display room air quality**		**RM UNIT ST17**
☑	Room operator unit 1	Room unit, air quality display	Symbolic		RM UNIT ST17
☑	**Room operator unit 1**	**Room unit, display heat./cool. status**	**Yes**		**RM UNIT ST17**
☐	Room operator unit 1	Enable operation: room temp. setpoint	No		RM UNIT ST17
☐	Room operator unit 1	Room unit, room temp. setpoint display	Absolute temperature setpoint		RM UNIT ST17
☐	Room operator unit 1	Enable operation: fan speed setpoint	No		RM UNIT ST17
☐	Room operator unit 1	Enable operation: presence button	No		RM UNIT ST17
☑	**Room operator unit 1**	**Enable operation: temporary comfort**	**Yes**		**RM UNIT ST17**
☑	**Room operator unit 1**	**Enable operation: room op.mode**	**Yes**		**RM UNIT ST17**
☑	**Room operator unit 1**	**Enable operation: green leaf**	Yes		**RM UNIT ST17**
☑	Setpoint shift input value	Present maximum value	5.4	°F	%RSegm%'ROpUnDev(1)'SpShftIn
☑	Setpoint shift input value	Present minimum value	-5.4	°F	%RSegm%'ROpUnDev(1)'SpShftIn

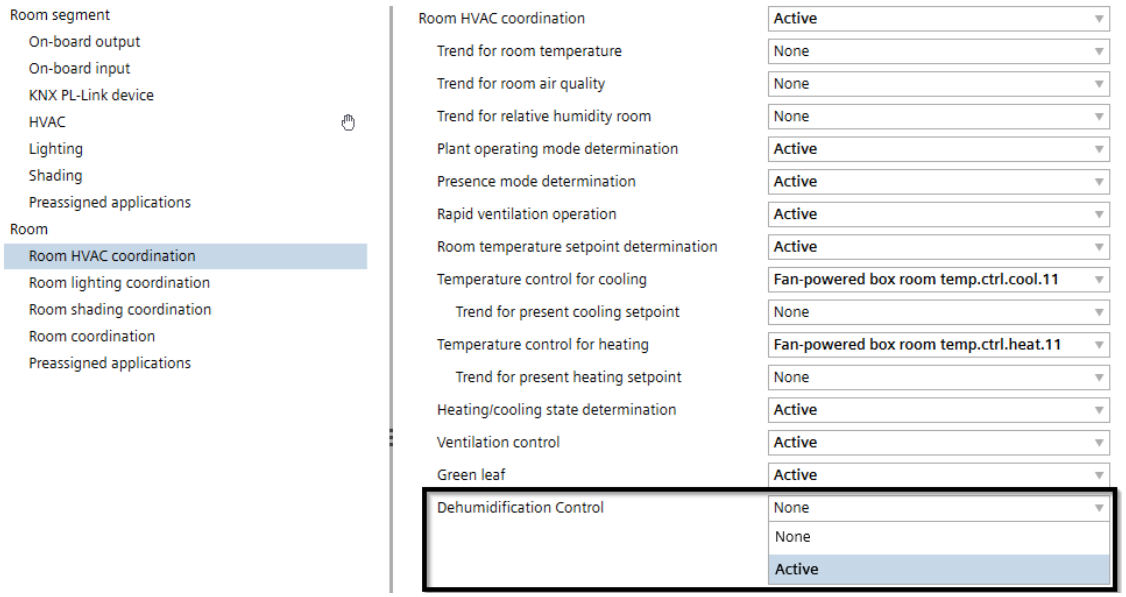
HVAC (Room Segment)

NOTE: The heating and cooling coils are defaulted to Supply Temperature control. If this is not the control method desired, they MUST be changed from defaults (to Room temperature control). When changed, they will show the override symbol next to them. This just means they are changed from the suggested option.



Room HVAC Coordination

Dehumidification control (based on Dewpoint) is activated here. It is set to “None” by default and must be changed to “Active” if desired for this Room.


Room segment
On-board output
On-board input
KNX PL-Link device
HVAC
Lighting
Shading
Preassigned applications
Room
Room HVAC coordination
Room lighting coordination
Room shading coordination
Room coordination
Preassigned applications
Room HVAC coordination
Active
Trend for room temperature
None
Trend for room air quality
None
Trend for relative humidity room
None
Plant operating mode determination
Active
Presence mode determination
Active
Rapid ventilation operation
Active
Room temperature setpoint determination
Active
Temperature control for cooling
Fan-powered box room temp.ctrl.cool.11
Trend for present cooling setpoint
None
Temperature control for heating
Fan-powered box room temp.ctrl.heat.11
Trend for present heating setpoint
None
Heating/cooling state determination
Active
Ventilation control
Active
Green leaf
Active
Dehumidification Control
None
None
Active

3 – ABT Site Configuration Default Values

Room HVAC Coordination

Room Operating Mode Determination

	Room operating mode determination				
☑	Room operating mode determination	Time for comfort button	120:00:000	mm:ss:ms	%R%'ROpModDtr
☑	Room operating mode determination	Comfort button inactive configuration	Auto		%R%'ROpModDtr
☐	Room operating mode determination	Op.command for energy effic.at automatic	Automatic		%R%'ROpModDtr
☑	Room operating mode determination	Manual operation lock configuration	Protection & Economy		%R%'ROpModDtr
☐	Room operating mode determination	Comfort/Pre-Comf./Economy to Protection	Energy efficiency condition		%R%'ROpModDtr
☐	Room operating mode determination	Comfort/Pre-Comfort to Economy	Energy efficiency condition		%R%'ROpModDtr
☐	Room operating mode determination	Comfort to Pre-Comfort	Energy efficiency condition		%R%'ROpModDtr
☐	Room operating mode determination	Protection/Economy/Pre-Comf.to Comfort	Comfort condition		%R%'ROpModDtr
☐	Room operating mode determination	Protection/Economy to Pre-Comfort	None		%R%'ROpModDtr
☐	Room operating mode determination	Protection to Economy	None		%R%'ROpModDtr
☐	Room operating mode determination	Repetition time energy efficiency trig.	60:00:000	mm:ss:ms	%R%'ROpModDtr
☐	Room operating mode determination	Repetition number energy effic.trigger	0	---	%R%'ROpModDtr
☑	**Room operating mode determination**	**Source for present operating mode**	**Plant op.mode**		**%R%'ROpModDtr**

- **Source of the present operating mode** [default= ROpMod]: Considers the impact of window contact, presence detector, manual fan operation inputs have on the room operating mode. Should be set to PltOpMod for proper sequencing.
- **Manual operation lock configuration** [default = ProtEcon]: Locks the manual operation of the room unit, during centrally scheduled room operating modes, so comfort cannot be increased/energy efficiency is maintained. Configure to support the appropriate room operating modes; 1: None, 2: Protection, 3: Protection/Economy, 4: Protection/Economy/Pre-Comfort.
- **Time for comfort button**, time period for the presence button and temporary Comfort, as triggered by the Comfort button [default time=2 hours].

Room green leaf

Typically, no changes are required for this section.

	Room green leaf				
☐	Room green leaf	Switch-on delay EEI indication	15:000	ss.ms	%R%'RGrnLf
☐	Room green leaf	Switch-on delay EEI indic.with shading	02:00:000	mm:ss:ms	%R%'RGrnLf

Room HVAC coordination

	Room HVAC coordination				
☐	Room HVAC coordination	Room air quality indication high limit	1600	ppm	%R%'RHvacCoo
☐	Room HVAC coordination	Room air quality indication low limit	1000	ppm	%R%'RHvacCoo

Plant operating mode determination

The room operating mode, presence detection, HVAC presence mode and window contact as well as the warm-up, cool down and free cooling signals received from the central workstation commands are read and used to determine the AHU plant operating modes. The plant operating mode (PltOpMod) is multi-state BACnet object and supports 17 different multiple states (1: Off, 2: Protection, 3: Economy, 4: Pre-Comfort, 5: Comfort, 6: Warm-up,7: Cooldown, …) Note: See Help file for more information.

There is a 5 minute [Default] switch delay between switching plant operating mode states when a person is present/absent from the room.

☑	Plant operating mode determination	Switch delay when present	05:00:000	mm:ss:ms	%R%'RHvacCoo'PltModDtr
☑	Plant operating mode determination	Switch delay when absent	05:00:000	mm:ss:ms	%R%'RHvacCoo'PltModDtr

Presence mode determination

	Presence mode determination				
☑	**Presence mode determination**	**Presence mode for comfort**	ConsPres		**%R%'RHvacCoo'PscModDtr**
☐	Presence mode determination	Presence mode for pre-comfort	ConsPrAb		%R%'RHvacCoo'PscModDtr
☐	Presence mode determination	Presence mode for economy	None		%R%'RHvacCoo'PscModDtr
☐	Presence mode determination	Presence mode for protection	None		%R%'RHvacCoo'PscModDtr

Rapid ventilation operation

	Rapid ventilation operation				
☐	Rapid ventilation operation	Rapid ventilation runtime	60:00:000	mm:ss:ms	%R%'RHvacCoo'RpdVntOp
☐	Rapid ventilation operation	Op.command for energy effic.at automatic	None		%R%'RHvacCoo'RpdVntOp
☐	Rapid ventilation operation	Op.command for energy effic.at manual	None		%R%'RHvacCoo'RpdVntOp
☐	Rapid ventilation operation	Op.command for comfort cond.at automatic	None		%R%'RHvacCoo'RpdVntOp
☐	Rapid ventilation operation	Op.command for comfort cond.at manual	None		%R%'RHvacCoo'RpdVntOp

Room temperature setpoint determination

	Room temperature setpoint determination				
☐	Room temperature setpoint determination	Op.command for energy effic.at automatic	Automatic		%R%'RHvacCoo'SpTRDtr
☐	Room temperature setpoint determination	Op.command for energy effic.at manual	None		%R%'RHvacCoo'SpTRDtr
☑	**Room temperature setpoint determination**	**Display absolute room temp.setpoint**	**Present value**		**%R%'RHvacCoo'SpTRDtr**

Temperature control for cooling

NOTE: Setting the Fan Operation to “Series” allows the fan or coil to modulate to 100% before the next device in the sequence comes on.

	Temperature control for cooling				
☑	**Temperature control for cooling**	**Fan operation**	Series		**%R%'RHvacCoo'TCtlC**
☐	Temperature control for cooling	Coil valve start pos.by parall.operation	10	%	%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Coil valve end pos.by parallel operation	100	%	%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Fan end speed by parallel operation	50	%	%R%'RHvacCoo'TCtlC

Room operating mode configuration for cooling devices

Each room operating mode can be configured to support one of the following heating device configurations: None, Radiant & air treatment devices (RadATrDv), Radiant devices (RadDev), Air treatment devices (ATreaDev).

Typically, no changes are required for this section.

☐	Temperature control for cooling	Comfort configuration	RadATrDv		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Pre-Comfort configuration	RadATrDv		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Economy configuration	RadATrDv		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Protection configuration	RadATrDv		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Cool down configuration	RadATrDv		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Free cooling configuration	RadATrDv		%R%'RHvacCoo'TCtlC

Controller mode by room operating mode

The operation of the cooling coil or radiant devices can be configured to operate either in: Continuous (modulating) or 2-Position for each room operating mode. This allows radiant devices to easily be configure for cool-down mode.

Typically, no changes are required for this section.

☐	Temperature control for cooling	Coil: controller mode by comfort	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Coil: controller mode by pre-comfort	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Coil: controller mode by economy	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Coil: controller mode by protection	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Coil: controller mode by cool down	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Radiant devices: ctr.mode by comfort	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Radiant devices: ctr.mode by pre-comfort	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Radiant devices: ctr.mode by economy	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Radiant devices: ctr.mode by protection	Cont		%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Radiant devices: ctr.mode by cool down	Cont		%R%'RHvacCoo'TCtlC

Order sequencing for Cooling devices

The order sequencing for the cooling devices have default settings. They should NOT be modified, as there is custom logic that controls the sequencing of the fan and coil based on Outside Air Temperature, per the Sequence of Operations.

If a cooling device is not selected as an output device, it will not be used during the cooling sequence.

☐	Temperature control for cooling	Radiant ceiling cooling sequence	1	---	%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Heating/cooling coil cooling sequence	2	---	%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Cooling coil cooling sequence	3	---	%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	Fan cooling sequence	4	---	%R%'RHvacCoo'TCtlC
☐	Temperature control for cooling	VAV cooling sequence	5	---	%R%'RHvacCoo'TCtlC

Room temperature controller cooling for VAV

☑	Room temp.controller cooling for VAV	Gain	27.8	%/°F	%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Hysteresis switch-off	0.9	°F	%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Hysteresis switch-on	0.9	°F	%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Neutral zone	0	°F	%R%'RHvacCoo'TCtlC'VavTRCtrC
☑	Room temp.controller cooling for VAV	Integral action time Tn	900	s	%R%'RHvacCoo'TCtlC'VavTRCtrC
☑	Room temp.controller cooling for VAV	Controller type	PID controller		%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Controller output maximum	100	%	%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Controller output minimum	0	%	%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Controller output for offset	0	%	%R%'RHvacCoo'TCtlC'VavTRCtrC
☑	Room temp.controller cooling for VAV	Rise time from 0 to 100%	600	1/10s	%R%'RHvacCoo'TCtlC'VavTRCtrC
☑	Room temp.controller cooling for VAV	Fall time from 100 to 0%	600	1/10s	%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Number of stages	1	---	%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Switch delay	05:00	mm:ss	%R%'RHvacCoo'TCtlC'VavTRCtrC
☐	Room temp.controller cooling for VAV	Derivative action-time Tv	0	s	%R%'RHvacCoo'TCtlC'VavTRCtrC

Room temperature controller cooling for fan

☑	Room temp.controller cooling for fan	Gain	27.8	%/°F	%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Hysteresis switch-off	0.9	°F	%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Hysteresis switch-on	0.9	°F	%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Neutral zone	0	°F	%R%'RHvacCoo'TCtlC'FanTRCtrC
☑	Room temp.controller cooling for fan	Integral action time Tn	1800	s	%R%'RHvacCoo'TCtlC'FanTRCtrC
☑	Room temp.controller cooling for fan	Controller type	PID controller		%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Controller output maximum	100	%	%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Controller output minimum	0	%	%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Controller output for offset	0	%	%R%'RHvacCoo'TCtlC'FanTRCtrC
☑	Room temp.controller cooling for fan	Rise time from 0 to 100%	600	1/10s	%R%'RHvacCoo'TCtlC'FanTRCtrC
☑	Room temp.controller cooling for fan	Fall time from 100 to 0%	600	1/10s	%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Number of stages	1	---	%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Switch delay	05:00	mm:ss	%R%'RHvacCoo'TCtlC'FanTRCtrC
☐	Room temp.controller cooling for fan	Derivative action-time Tv	0	s	%R%'RHvacCoo'TCtlC'FanTRCtrC

Room temperature controller cooling for cooling coil

☑	Room temp.ctr.cooling for cooling coil	Gain	27.8	%/°F	%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Hysteresis switch-off	0.9	°F	%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Hysteresis switch-on	0.9	°F	%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Neutral zone	0	°F	%R%'RHvacCoo'TCtlC'CclTRCtrC
☑	Room temp.ctr.cooling for cooling coil	Integral action time Tn	1800	s	%R%'RHvacCoo'TCtlC'CclTRCtrC
☑	Room temp.ctr.cooling for cooling coil	Controller type	PID controller		%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Controller output maximum	100	%	%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Controller output minimum	0	%	%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Controller output for offset	0	%	%R%'RHvacCoo'TCtlC'CclTRCtrC
☑	Room temp.ctr.cooling for cooling coil	Rise time from 0 to 100%	600	1/10s	%R%'RHvacCoo'TCtlC'CclTRCtrC
☑	Room temp.ctr.cooling for cooling coil	Fall time from 100 to 0%	600	1/10s	%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Number of stages	1	---	%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Switch delay	05:00	mm:ss	%R%'RHvacCoo'TCtlC'CclTRCtrC
☐	Room temp.ctr.cooling for cooling coil	Derivative action-time Tv	0	s	%R%'RHvacCoo'TCtlC'CclTRCtrC

Cooling Setpoints for Room operating mode

The cooling setpoints for each operating mode can be configured to meet job site specifications. Default values shown are based on ASHRAE 90.1-2016 recommendations.

☑	**Cooling setpoint for comfort**	**Default command**	**75**	**°F**	**CMF CLG STPT**
☑	**Delta cooling setpoint for pre-comfort**	**Present value**	**2**	**°F**	**STBY C DELTA**
☑	**Cooling setpoint for economy**	**Present value**	**85**	**°F**	**ECO CLG STPT**
☑	**Cooling setpoint for protection**	**Present value**	**95**	**°F**	**PROT CLGSTPT**

Additional Parameters

To add 'Additional parameters' to the Default values, Left click on Show/hide parameter... in the upper right of the Configuration Tab screen. Select %RSegm%, HvacCoo'TCtlC, then ▼ Add and OK.

These parameters control the change in sequencing based on the Outside Air Temperature.

☑	Hysteresis for OA sequencing	Present value	1	°F	HYS OA SEQ
☑	Switch on delay for OA sequence switch	Present value	30	s	DLYON OA SEQ
☑	Switch off delay for OA sequence switch	Present value	30	s	DLYOFF OASEQ

Temperature control for heating

NOTE: For correct sequencing, “Fan Operation” should be set to “Series”.

	Temperature control for heating				
☑	**Temperature control for heating**	**Fan operation**	**Series**		**%R%'RHvacCoo'TCtlH**
☐	Temperature control for heating	Coil valve start pos.by parall.operation	10	%	%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Coil valve end pos.by parallel operation	100	%	%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Fan end speed by parallel operation	50	%	%R%'RHvacCoo'TCtlH

Room operating mode configuration for heating devices

Each room operating mode can be configured to support one of the following heating device configurations: None, Radiant & air treatment devices (RadATrDv), Radiant devices (RadDev), Air treatment devices (ATreaDev).

Typically, no changes are required for this section.

☐	Temperature control for heating	Comfort configuration	RadATrDv		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Pre-Comfort configuration	RadATrDv		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Economy configuration	RadATrDv		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Protection configuration	RadATrDv		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Warm-up configuration	RadATrDv		%R%'RHvacCoo'TCtlH

Controller mode by room operating mode

The operation of the heating coil or radiant devices can be configured to operate either in: Continuous (modulating) or 2-Position for each room operating mode. This allows radiant devices to easily be configured for warm-up mode.

Typically, no changes are required for this section.

☐	Temperature control for heating	Coil: controller mode by comfort	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Coil: controller mode by pre-comfort	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Coil: controller mode by economy	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Coil: controller mode by protection	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Coil: controller mode by warm-up	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Radiant devices: ctr.mode by comfort	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Radiant devices: ctr.mode by pre-comfort	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Radiant devices: ctr.mode by economy	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Radiant devices: ctr.mode by protection	Cont		%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Radiant devices: ctr. mode by warm-up	Cont		%R%'RHvacCoo'TCtlH

Order Sequencing for Heating Devices

☐	Temperature control for heating	Radiator heating sequence	1	---	%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Radiant ceiling heating sequence	2	---	%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Heating/cooling coil heating sequence	3	---	%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Heating coil heating sequence	4	---	%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	Fan heating sequence	5	---	%R%'RHvacCoo'TCtlH
☐	Temperature control for heating	VAV heating sequence	6	---	%R%'RHvacCoo'TCtlH

Room temperature controller heating for VAV

☑	Room temp.controller heating for VAV	Gain	27.8	%/°F	%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Hysteresis switch-off	0.9	°F	%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Hysteresis switch-on	0.9	°F	%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Neutral zone	0	°F	%R%'RHvacCoo'TCtlH'VavTRCtrH
☑	Room temp.controller heating for VAV	Integral action time Tn	900	s	%R%'RHvacCoo'TCtlH'VavTRCtrH
☑	Room temp.controller heating for VAV	Controller type	PID controller		%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Controller output maximum	100	%	%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Controller output minimum	0	%	%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Controller output for offset	0	%	%R%'RHvacCoo'TCtlH'VavTRCtrH
☑	Room temp.controller heating for VAV	Rise time from 0 to 100%	600	1/10s	%R%'RHvacCoo'TCtlH'VavTRCtrH
☑	Room temp.controller heating for VAV	Fall time from 100 to 0%	600	1/10s	%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Number of stages	1	---	%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Switch delay	05:00	mm:ss	%R%'RHvacCoo'TCtlH'VavTRCtrH
☐	Room temp.controller heating for VAV	Derivative action-time Tv	0	s	%R%'RHvacCoo'TCtlH'VavTRCtrH

Room temperature controller heating for fan

☑	Room temp.controller heating for fan	Gain	27.8	%/°F	%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Hysteresis switch-off	0.9	°F	%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Hysteresis switch-on	0.9	°F	%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Neutral zone	0	°F	%R%'RHvacCoo'TCtlH'FanTRCtrH
☑	Room temp.controller heating for fan	Integral action time Tn	1800	s	%R%'RHvacCoo'TCtlH'FanTRCtrH
☑	Room temp.controller heating for fan	Controller type	PID controller		%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Controller output maximum	100	%	%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Controller output minimum	0	%	%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Controller output for offset	0	%	%R%'RHvacCoo'TCtlH'FanTRCtrH
☑	Room temp.controller heating for fan	Rise time from 0 to 100%	600	1/10s	%R%'RHvacCoo'TCtlH'FanTRCtrH
☑	Room temp.controller heating for fan	Fall time from 100 to 0%	600	1/10s	%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Number of stages	1	---	%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Switch delay	05:00	mm:ss	%R%'RHvacCoo'TCtlH'FanTRCtrH
☐	Room temp.controller heating for fan	Derivative action-time Tv	0	s	%R%'RHvacCoo'TCtlH'FanTRCtrH

Room temperature controller heating for heating coil

☑	Room temp.ctr.heating for heating coil	Gain	27.8	%/°F	%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Hysteresis switch-off	0.9	°F	%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Hysteresis switch-on	0.9	°F	%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Neutral zone	0	°F	%R%'RHvacCoo'TCtlH'HclTRCtrH
☑	Room temp.ctr.heating for heating coil	Integral action time Tn	1800	s	%R%'RHvacCoo'TCtlH'HclTRCtrH
☑	Room temp.ctr.heating for heating coil	Controller type	PID controller		%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Controller output maximum	100	%	%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Controller output minimum	0	%	%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Controller output for offset	0	%	%R%'RHvacCoo'TCtlH'HclTRCtrH
☑	Room temp.ctr.heating for heating coil	Rise time from 0 to 100%	600	1/10s	%R%'RHvacCoo'TCtlH'HclTRCtrH
☑	Room temp.ctr.heating for heating coil	Fall time from 100 to 0%	600	1/10s	%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Number of stages	1	---	%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Switch delay	05:00	mm:ss	%R%'RHvacCoo'TCtlH'HclTRCtrH
☐	Room temp.ctr.heating for heating coil	Derivative action-time Tv	0	s	%R%'RHvacCoo'TCtlH'HclTRCtrH

Heating setpoints for Room operating mode

The heating setpoints for each operating mode can be configured to meet job site specifications. Default values shown are set based on ASHRAE 90.1-2016 recommendations.

☑	Heating setpoint for comfort	Default command	70	°F	CMF HTG STPT
☑	Delta heating setpoint for pre-comfort	Present value	2	°F	STBY H DELTA
☑	Heating setpoint for economy	Present value	65	°F	ECO HTG STPT
☑	Heating setpoint for protection	Present value	55	°F	PROT HTG SP

Heating/cooling state determination

	Heating/cooling state determination				
☐	Heating/cooling state determination	Shift of switch-on point for cool.state	0	°F	%R%'RHvacCoo'HCStaDtr
☐	Heating/cooling state determination	Shift of switch-on point for heat.state	0	°F	%R%'RHvacCoo'HCStaDtr
☑	Heating/cooling state determination	Switch-on delay for heat/cool.changeover	02:00:000	mm:ss:ms	%R%'RHvacCoo'HCStaDtr

Ventilation control

Ventilation control type for each room operating mode

Each room operating mode has a ventilation control type. Configure ventilation control to meet job specification requirements. The following ventilation control types are supported: Off (no ventilation), MnVent (Minimum ventilation), DCV (Demand control ventilation) and MnVntDCV (Minimum ventilation & Demand control ventilation).

To support demand ventilation, a QMX3.74 must be defined as the room operator unit as this device provides a CO_2 sensor. Set the ventilation control parameters to meet job specific requirements.

☑	Ventilation control	Comfort configuration	MnVntDCV		%R%'RHvacCoo'VntCtl
☑	Ventilation control	Pre-Comfort configuration	DCV		%R%'RHvacCoo'VntCtl
☑	Ventilation control	Economy configuration	Off		%R%'RHvacCoo'VntCtl
☑	Ventilation control	Protection configuration	Off		%R%'RHvacCoo'VntCtl

Minimum air volume flow for room operating modes

Set the ventilation control parameters to meet job specific requirements.

	Ventilation control				
☑	**Ventilation control**	**Minimum room air volume flow for comfort**	**100**	**ft3/min**	**%R%'RHvacCoo'VntCtl**
☑	**Ventilation control**	**Min.room air volume flow for pre-comfort**	**100**	**ft3/min**	**%R%'RHvacCoo'VntCtl**
☑	**Ventilation control**	**Minimum room air volume flow for economy**	**0**	**ft3/min**	**%R%'RHvacCoo'VntCtl**
☑	**Ventilation control**	**Min.room air volume flow for protection**	**0**	**ft3/min**	**%R%'RHvacCoo'VntCtl**

Ventilation control for VAV damper

☑	Ventilation controller	Gain	0.23	%/ppm	%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Hysteresis switch-off	100	ppm	%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Hysteresis switch-on	100	ppm	%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Neutral zone	0	ppm	%R%'RHvacCoo'VntCtl'VntCtr
☑	Ventilation controller	Integral action time Tn	1800	s	%R%'RHvacCoo'VntCtl'VntCtr
☑	Ventilation controller	Controller type	PID controller		%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Controller output maximum	100	%	%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Controller output minimum	0	%	%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Controller output for offset	0	%	%R%'RHvacCoo'VntCtl'VntCtr
☑	Ventilation controller	Rise time from 0 to 100%	600	1/10s	%R%'RHvacCoo'VntCtl'VntCtr
☑	Ventilation controller	Fall time from 100 to 0%	600	1/10s	%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Number of stages	1	---	%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Switch delay	05:00	mm:ss	%R%'RHvacCoo'VntCtl'VntCtr
☐	Ventilation controller	Derivative action-time Tv	0	s	%R%'RHvacCoo'VntCtl'VntCtr

Room air quality setpoints for each room operating mode

NOTE: the “Setpoint room air quality for comfort” is a calculated value, so whatever it is set at here will be overwritten once the application is uploaded. It is calculated based on the Outdoor Air Quality and a Differential (see "Additional parameters" below).

☑	Setp.room air quality for pre-comfort	Present value	1100	ppm	STBY DCV SP
☑	Setpoint room air quality for economy	Present value	1500	ppm	ECO DCV STPT
☑	Setpoint room air quality for protection	Present value	1500	ppm	PROT DCV SP

Additional parameters

To add 'Additional parameters' to the Default values, click Show/hide parameter... and select %R%'HvacCoo'VntCtr.

☑	Outside air quality	Present value	0	ppm	OA QUAL
☑	Difference between OA Quality and setpoint	Present value	500	ppm	OAQ DIFF

Dehumidification Control

This application includes a Dehumidification controller that is set to turn on if the space dewpoint is above the dewpoint setpoint for that mode. When active with default settings, the controller will output a 100% signal that will be sent to the Room Segment to control the damper. Can be changed to PID controller.

Default values for the dehumidification controller identify settings for the controller.

	Dehumidification control				
☑	Dehumidification Control	Controller type	Stage controller		%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Controller output maximum	100	%	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Controller output minimum	0	%	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Controller output for offset	0	%	%R%'RHvacCoo'DhuCtl'DhuCtr
☑	Dehumidification Control	Gain	10	%/°F	%R%'RHvacCoo'DhuCtl'DhuCtr
☑	Dehumidification Control	Rise time from 0 to 100%	600	1/10s	%R%'RHvacCoo'DhuCtl'DhuCtr
☑	Dehumidification Control	Fall time from 100 to 0%	600	1/10s	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Number of stages	1	---	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Switch delay	05:00	mm:ss	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Hysteresis switch-off	0.5	°F	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Hysteresis switch-on	0.5	°F	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Neutral zone	0.5	°F	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Integral action time Tn	120	s	%R%'RHvacCoo'DhuCtl'DhuCtr
☐	Dehumidification Control	Derivative action-time Tv	0	s	%R%'RHvacCoo'DhuCtl'DhuCtr

To add 'Additional parameters' to the Default values, click Show/hide parameter... and select %R%'HvacCoo'DhuCtl'.

☑	**Comfort configuration**	**Present value**	**Dehumidify**		**%R%'RHvacCoo'DhuCtl'CmfCnf**
☑	Pre-Comfort configuration	Present value	Dehumidify		%R%'RHvacCoo'DhuCtl'PcfCnf
☑	Economy configuration	Present value	Off		%R%'RHvacCoo'DhuCtl'EcoCnf
☑	Protection configuration	Present value	Off		%R%'RHvacCoo'DhuCtl'PrtCnf
☑	**Dewpoint setpoint for comfort**	**Present value**	**60**	**°F**	**CMF DP STPT**
☑	Dewpoint setpoint for pre-comfort	Present value	60	°F	STBY DP STPT
☑	**Dewpoint setpoint for economy**	**Present value**	**60**	**°F**	**ECO DP STPT**
☑	**Dewpoint setpoint for protection**	**Present value**	**60**	**°F**	**PROT DP STPT**

NOTE: In order for the dehumidification controller to run during unoccupied modes, the configuration must be changed from defaults using these Additional Parameters.

Room Segment, Hvac

Supply air VAV damper 12, parameters

Default values for the Supply air VAV identify the settings for the damper. Be sure to set the **Nominal air volume flow** to meet job requirements.

☐	Supply air VAV	Switch-on point for differential press.	0.001	inWC	%RSegm%'HVAC'VavSu
☐	Supply air VAV	Hysteresis for differential pressure	0.0004	inWC	%RSegm%'HVAC'VavSu
☑	**Supply air VAV**	**Nominal air volume flow**	**100**	**ft3/min**	**%RSegm%'HVAC'VavSu**
☐	**Supply air VAV**	**Air volume flow relief**	**0**	**ft3/min**	**%RSegm%'HVAC'VavSu**
☐	Supply air VAV	Switch-on point for air vol.flow state	4	%	%RSegm%'HVAC'VavSu
☐	Supply air VAV	Hysteresis for air volume flow state	2	%	%RSegm%'HVAC'VavSu
☐	Supply air VAV	Setpoint selector for extract air VAV	SupAirFl		%RSegm%'HVAC'VavSu
☐	Supply air VAV	Enable deviation calculation	Yes		%RSegm%'HVAC'VavSu
☐	Supply air VAV	Enable saturation calculation	Yes		%RSegm%'HVAC'VavSu
☐	Supply air VAV	Saturation level	90	%	%RSegm%'HVAC'VavSu
☐	Supply air VAV	Air volume flow error limit	0	%	%RSegm%'HVAC'VavSu
☐	Supply air VAV	Switch-on delay saturation	60:000	ss.ms	%RSegm%'HVAC'VavSu
☐	Supply air VAV	Switch-on point for air flow demand	4	%	%RSegm%'HVAC'VavSu
☐	Supply air VAV	Hysteresis for air flow demand	2	%	%RSegm%'HVAC'VavSu
☐	Supply air VAV	Enable relief	No		%RSegm%'HVAC'VavSu
☐	Supply air VAV	Enable monitoring for fan state	No		%RSegm%'HVAC'VavSu
☐	Supply air VAV	Enable monitoring for no air volume flow	Yes		%RSegm%'HVAC'VavSu

Supply air VAV air flow controller

☑	Supply air VAV air flow controller	Gain	0.3	%/%	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☑	Supply air VAV air flow controller	Integral action time Tn	30	s	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Controller type	PID controller		%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Controller output maximum	100	%	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Controller output minimum	0	%	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Controller output for offset	0	%	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☑	Supply air VAV air flow controller	Rise time from 0 to 100%	600	1/10s	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☑	Supply air VAV air flow controller	Fall time from 100 to 0%	600	1/10s	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Number of stages	1	---	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Switch delay	05:00	mm:ss	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Hysteresis switch-off	0.5	%	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Hysteresis switch-on	0.5	%	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Neutral zone	0.5	%	%RSegm%'HVAC'VavSu'VavSuAirFlCtr
☐	Supply air VAV air flow controller	Derivative action-time Tv	0	s	%RSegm%'HVAC'VavSu'VavSuAirFlCtr

Supply air VAV balancing parameters

☐	Supply air VAV balancing state	Present value	Initial		%RSegm%'HVAC'VavSu'VavSuBalSta
☐	Supply air VAV balancing mode	Present value	MxCool		%RSegm%'HVAC'VavSu'VavSuBalMod
☐	Supply air VAV air volume flow at hood	Present value	58.9	ft3/min	%RSegm%'HVAC'VavSu'VavSuAirFlHood
☐	Supply air VAV recorded balancing mode	Present value	MxCool		%RSegm%'HVAC'VavSu'VavSuBalModRec
☐	Supply air VAV recorded air flow at hood	Present value	0	ft3/min	%RSegm%'HVAC'VavSu'VavSuAflHodRec
☐	Supply air VAV recorded flow coefficient	Present value	0	---	%RSegm%'HVAC'VavSu'VavSuFlCoefRec
☐	Supply air VAV initial flow coefficient	Present value	0	---	%RSegm%'HVAC'VavSu'VavSuFlCoefIni
☐	Supply air VAV recorded air volume flow	Present value	0	ft3/min	%RSegm%'HVAC'VavSu'VavSuAirFlRec
☐	Supply air VAV recorded position	Present value	0	%	%RSegm%'HVAC'VavSu'VavSuPosRec

Supply air VAV sizing and flow parameters

Be sure to set supply flows for the job requirements. If VAV is meant to only control ventilation and Primary Air, set max and min flows for heating and cooling to zero.

☑	Supply air VAV duct area	Present value	0.54	ft2	DUCT AREA
☐	Supply air VAV duct shape	Present value	Round		%RSegm%'HVAC'VavSu'VavSuDuctShape
☐	Supply air VAV dimension A	Present value	7.9	in	%RSegm%'HVAC'VavSu'VavSuDmsnA
☐	Supply air VAV dimension B	Present value	7.9	in	%RSegm%'HVAC'VavSu'VavSuDmsnB
☐	Supply air VAV flow coefficient	Present value	0.73	---	FLOW COEF
☐	Supply air VAV smoke ctrl.air flow setp.	Present value	29.4	ft3/min	%RSegm%'HVAC'VavSu'VavSuSpAflSmk
☑	**Supply air VAV max.air vol.flow f.cool.**	**Present value**	**0**	**ft3/min**	**CLG FLOW MAX**
☑	**Supply air VAV min.air vol.flow f.cool.**	**Present value**	**0**	**ft3/min**	**CLG FLOW MIN**
☑	**Supply air VAV max.air vol.flow f.heat.**	**Present value**	**0**	**ft3/min**	**HTG FLOW MAX**
☑	**Supply air VAV min.air vol.flow f.heat.**	**Present value**	**0**	**ft3/min**	**HTG FLOW MIN**
☑	**Supply air VAV max.air vol.flow f.vent.**	**Present value**	**100**	**ft3/min**	**VENT FLO MAX**
☑	Supply air VAV min.air vol.flow f.vent.	Present value	0	ft3/min	VENT FLO MIN

To add ‘Additional parameters’ to the Default values, click **Show/hide parameter...** and select %RSegm%’HVAC’VavSu.

☑	Supply air flow VAV min. for dehum.	Present value	0	ft3/min	DHU FLO MIN
☑	Supply air VAV flow max. for dehum.	Present value	0	ft3/min	DHU FLO MAX
☑	Dehumidification mode output signal	Present value	Inactive		DHU MODE
☑	Switch on delay for dehumid. mode	Present value	60	s	DLYON DHUMO
☑	Switch off delay for dehumid. mode	Present value	60	s	DLYOFF DHUMO
☑	Supply air VAV max flow for unoccupied cooling	Present value	0	ft3/min	%RSegm%'HVAC'VavSu'VavSuUnocMaxC
☑	Supply air VAV max flow for unoccupied dehumidification	Present value	0	ft3/min	%RSegm%'HVAC'VavSu'VavSuUnocMaxDhu

Fan, Variable Speed Fan 11

Default values for the variable speed fan to identify settings for the fan.

	Fan				
☑	Fan	Enable state input	No		%RSegm%'HVAC'Fan
☐	Fan	Switch-on point for air vol.flow state	4	%	%RSegm%'HVAC'Fan
☐	Fan	Hysteresis for air volume flow state	2	%	%RSegm%'HVAC'Fan
☐	Fan	Switch-on delay for air vol.flow state	30:000	ss.ms	%RSegm%'HVAC'Fan
☐	Fan	Enable fan operation before heating coil	No		%RSegm%'HVAC'Fan
☑	Maximum fan speed for cooling	Present value	100	%	FAN CLG MAX
☑	**Minimum fan speed for cooling**	**Present value**	**15**	**%**	**FAN CLG MIN**
☑	Maximum fan speed for heating	Present value	100	%	FAN HTG MAX
☑	**Minimum fan speed for heating**	**Present value**	**12**	**%**	**FAN HTG MIN**
☑	Maximum fan speed for ventilation	Present value	100	%	FAN VENT MAX
☑	**Minimum fan speed for ventilation**	**Present value**	**5**	**%**	**FAN VENT MIN**
☑	Fan speed for dehumidification	Present value	50	%	FN SPD DEHUM
☑	**VAV end air volume flow**	**Present value**	**100**	**ft3/min**	**VAV FLOW END**
☑	**Fan start speed by fan-powered box**	**Present value**	**5**	**%**	**FAN SPD STRT**
☑	Fan end speed by fan-powered box	Present value	100	%	FAN END SPD

To add ‘Additional parameters’ to the Default values, click **Show/hide parameter...** and select %RSegm%’HVAC’Fan.

☑	Enable fan operation before cooling coil	Present value	Inactive		%RSegm%'HVAC'Fan'EnFanOpBfCcl

Cooling Coil, Chilled Water 13

Default values for the cooling coil to identify settings for the chilled water coil.

	Cooling coil				
☐	Cooling coil	Min.diff.dew point/chilled water temp.	1.8	°F	%RSegm%'HVAC'Ccl
☐	Cooling coil	Hys.f.min.diff.dew point/chilled w.temp.	1.8	°F	%RSegm%'HVAC'Ccl
☑	Cooling coil	Enable condensation monitor input	No		%RSegm%'HVAC'Ccl
☐	Cooling coil	Enable dew point temperature	No		%RSegm%'HVAC'Ccl
☐	Cooling coil	Switch-on point for chilled water demand	4	%	%RSegm%'HVAC'Ccl
☐	Cooling coil	Hysteresis for chilled water demand	2	%	%RSegm%'HVAC'Ccl
☐	Cooling coil	Switch-on point for air flow cool.req	4	%	%RSegm%'HVAC'Ccl
☐	Cooling coil	Hysteresis for air vol.flow cool.req.	2	%	%RSegm%'HVAC'Ccl
☑	Cooling coil	Switch-on delay for air flow cool.req.	30:000	ss.ms	%RSegm%'HVAC'Ccl
☐	Cooling coil	Enable monitoring for air vol.flow state	No		%RSegm%'HVAC'Ccl

To add ‘Additional parameters’ to the Default values, click Show/hide parameter... and select %RSegm%’HVAC’Ccl.

Heating Coil, Hot Water 11

Default values for the heating coil to identify settings for the hot water coil.

	Heating coil				
☐	Heating coil	Switch-on point for hot water demand	4	%	%RSegm%'HVAC'Hcl
☐	Heating coil	Hysteresis for hot water demand	2	%	%RSegm%'HVAC'Hcl
☐	Heating coil	Switch-on point for air flow heat.req	4	%	%RSegm%'HVAC'Hcl
☐	Heating coil	Hysteresis for air vol.flow heat.req.	2	%	%RSegm%'HVAC'Hcl
☑	Heating coil	Switch-on delay for air flow heat.req.	30:000	ss.ms	%RSegm%'HVAC'Hcl
☐	Heating coil	Enable monitoring for air vol.flow state	No		%RSegm%'HVAC'Hcl

To add ‘Additional parameters’ to the Default values, click Show/hide parameter... and select %RSegm%’HVAC’Hcl.

Appendix

Sequence of Operation

Occupied Mode:

FPS TU fan runs at minimum speed (determined at balancing to deliver the scheduled minimum airflow).

If zone temperature is within dead-band (70-75) keep coil valves closed and fan at min speed.

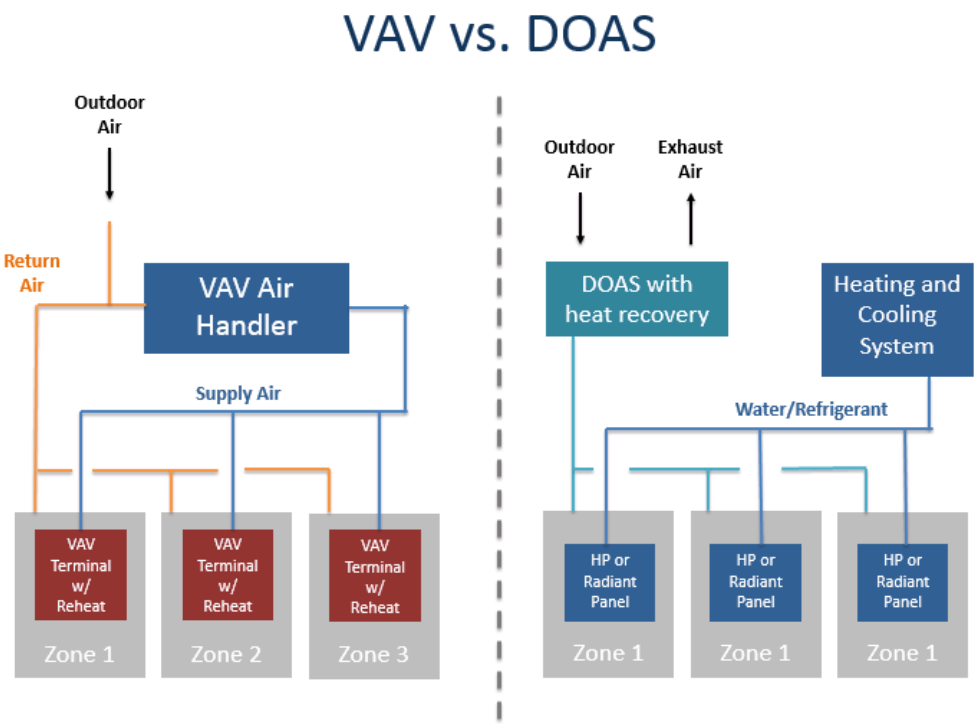
1) Heating control: Upon call for heating modulate HW valve open.
    a. If valve reaches 100% open and set-point is still not satisfied modulate fan speed up to maximum to maintain set point.
2) Cooling Control (Outside air temperature is less than space temperature setpoint):
    a. Upon call for cooling modulate fan speed up to maximum flow to maintain set point.
    b. If fan reaches maximum flow and set-point is not satisfied modulate CHW valve open.
3) Cooling Control (Outside air temperature is greater than space temperature setpoint):
    a. Upon call for cooling modulate CHW valve open.
    b. If valve reaches 100% open and set-point is still not satisfied modulate fan speed up to maximum.
4) Primary air damper is controlled to maintain primary air CFM setpoint.
    a. Zones with CO2 control:
5) When space CO2 exceeds CO2 set point (outdoor CO2 + 500 PPM) the CO2 loop will modulate primary air up to scheduled maximum (do not exceed scheduled maximum primary air) to maintain CO2 at set point.
6) When space CO2 is less than CO2 set point (outdoor CO2 + 500 PPM) the CO2 loop will modulate primary down to scheduled minimum (do not reduce below scheduled minimum primary air) to maintain CO2 at set point.
    a. Zones without CO2 control: Primary air damper is controlled to maintain primary air CFM setpoint.
7) Humidity Control: If space dewpoint is greater than space dewpoint setpoint, increase primary air flow to scheduled maximum primary air (do not exceed scheduled maximum primary air).
    a. If primary air reaches scheduled maximum in any zone, and the zone dewpoint is still above setpoint, enable 'Dehumidification Mode' at AHU.
8) Monitoring and alarm:
    a. Water sensor in FPS TU drain pans (see FPS TU drawing for units that have water sensors) monitor the overflow pan under the FPS TU. If water is sensed by any of the units that have these sensors, an alarm will be generated. The water sensor will need to be manually reset to clear the alarm.

Unoccupied Modes (Unocc. Heating, cooling and night flush):

1) When the zone temperature is within the set point deadband the terminal unit fan is off, the valves are closed, and the damper is closed.
2) When the terminal unit is in unoccupied. Heating mode, the terminal unit fan will run at minimum speed, the primary air will be zero (damper closed), and the heating valve will modulate to maintain heating set point.
3) When the terminal unit is in unoccupied. cooling mode, the terminal unit fan will run at minimum speed, the primary air will be set to the scheduled maximum, and the cooling and heating valves will remain closed.
4) Optimum Start: When associated AHU is in warm up or cool down mode, the space temperature setpoints shall be equal to the occupied setpoints.
5) Night Flush: When associated AHU is in night flush mode, the space temperature setpoint shall be equal to the night cooling setpoint.
6) Control Loops: All PID's are adjustable.

DOAS

A Dedicated Outside Air System (DOAS) controls the intake and delivery of outside air for ventilation in zones throughout the building. Unlike other systems, these units keep ventilation elements separate from the heating and cooling elements. This allows for better HVAC control of the different zones because each zone can be given individually required amounts of outdoor air as needed. This helps with comfort characteristics such as ventilation and humidity levels. Additionally, DOAS units assist with the energy efficiency of a building and can be a good fit to help satisfy the increasingly high standards with which HVAC systems must comply.



Engineering and commissioning

Design engineer may choose the type of output to the damper. The logic to create each output type is embedded in the PID/Staged controller object. There are two types of output:

- PID loop control creates **0 to 100%** analog dehumidification demand signal to drive a VAV damper.
- Staged loop control creates **0 / 100%** staged signal to drive a VAV damper.

Issued by
Siemens Industry, Inc.
Building Technologies Division
1000 Deerfield Pkwy
Buffalo Grove IL 60089
Tel. +1 847-215-1000

Document ID	A6V11786051	A6V11786051(AA)
Edition	2019-07-15	Restricted