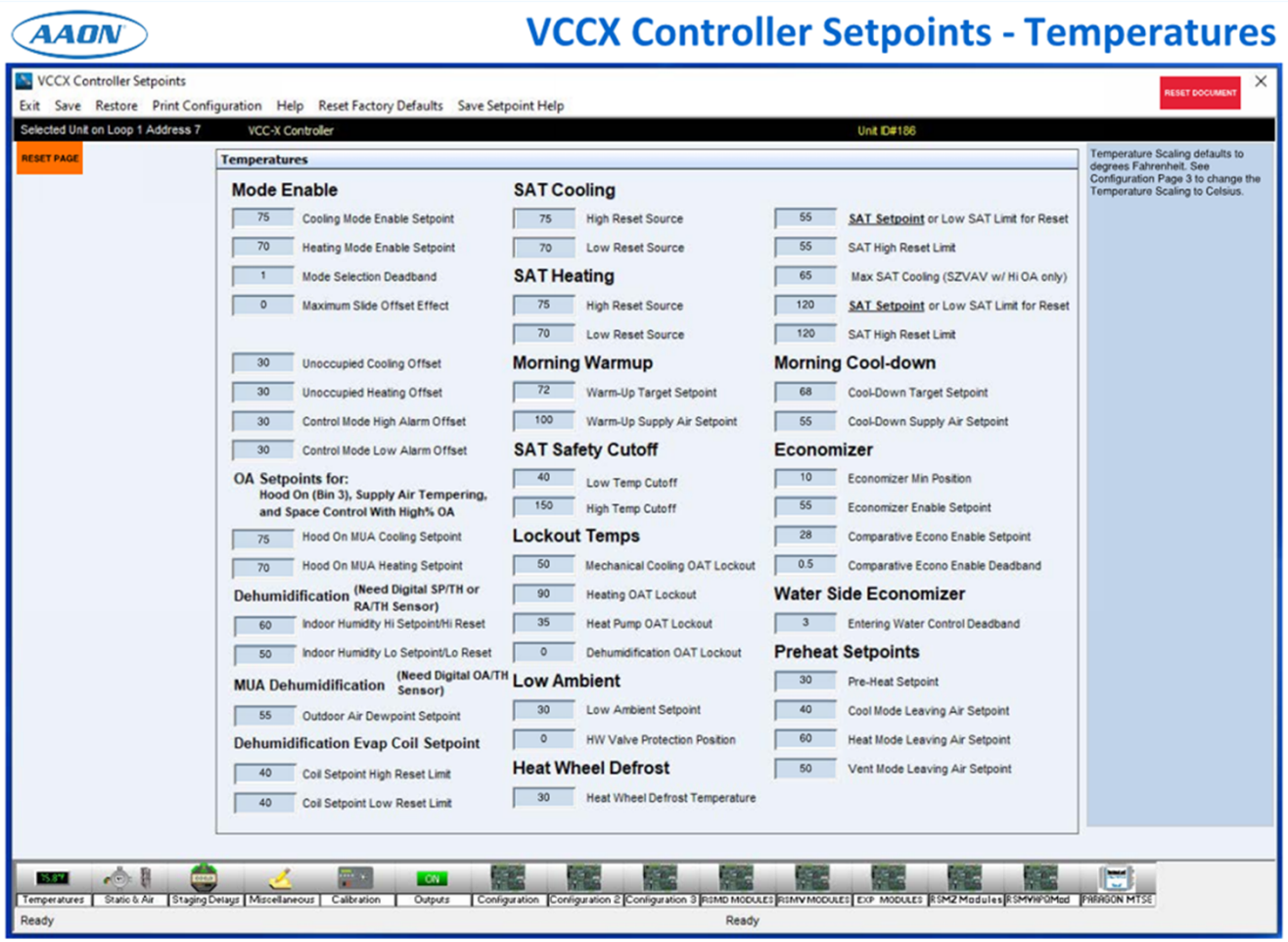
INSIGHT PARTNERS

AAON Prism II

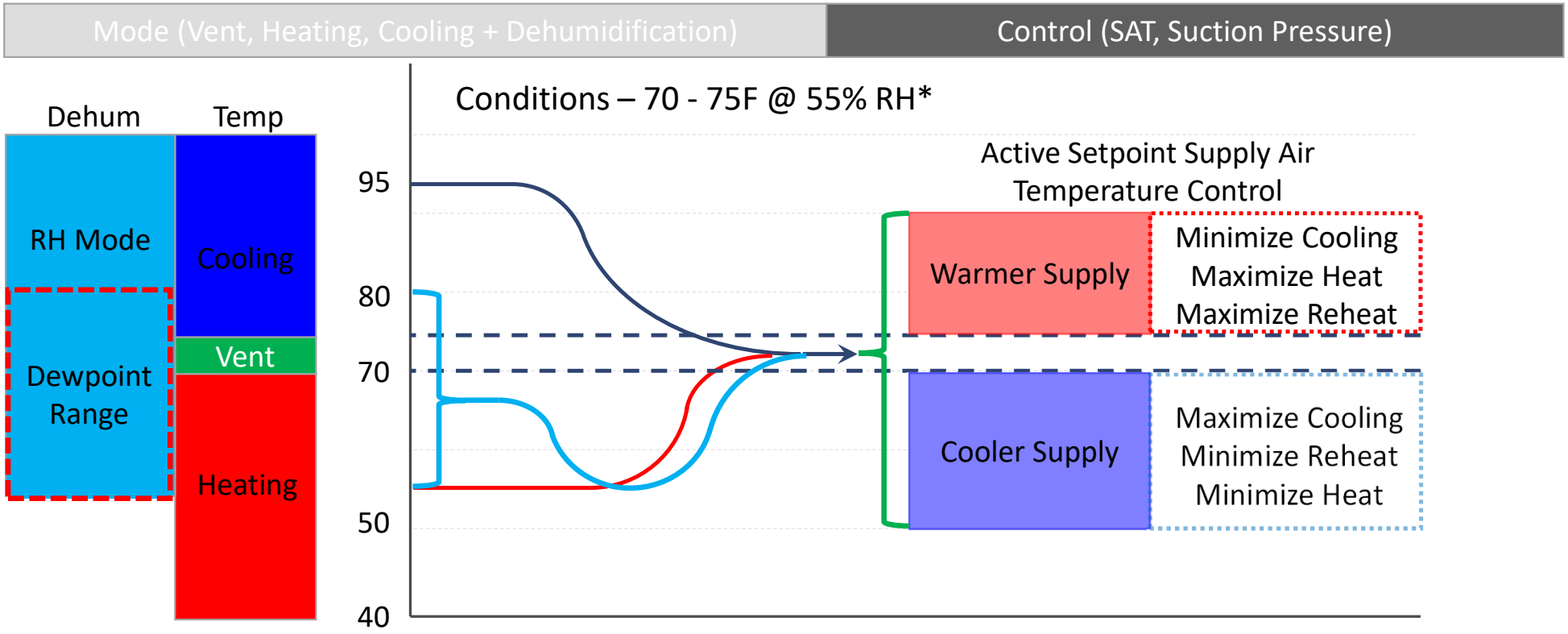
OVERVIEW

AAON ORION CONTROLS

Prism 2 –Setpoint Screen 1

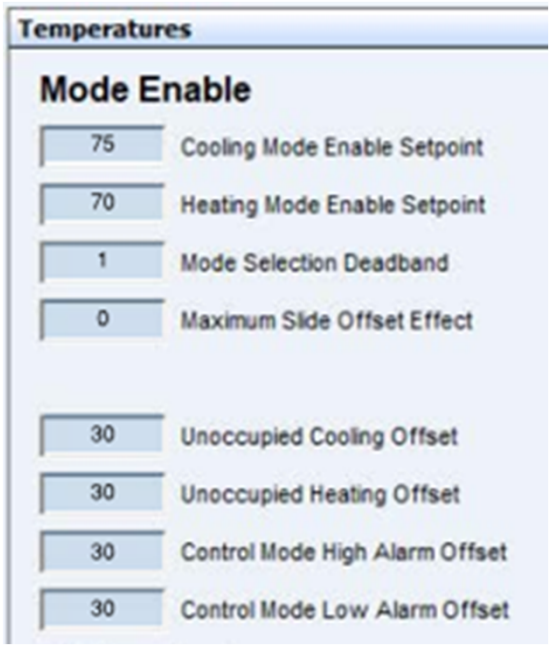


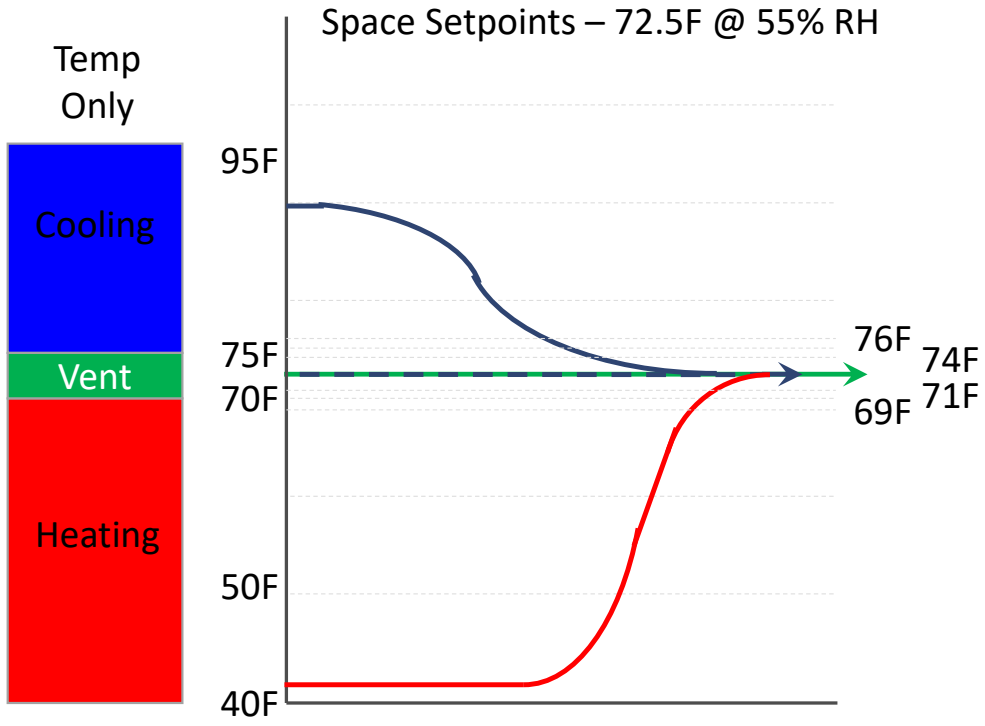
Make-Up Air Unit Control



** Factory Defaults Example, Hint, They Don't Work for Make-Up Air*

Prism 2 – Temperatures Mode Enable

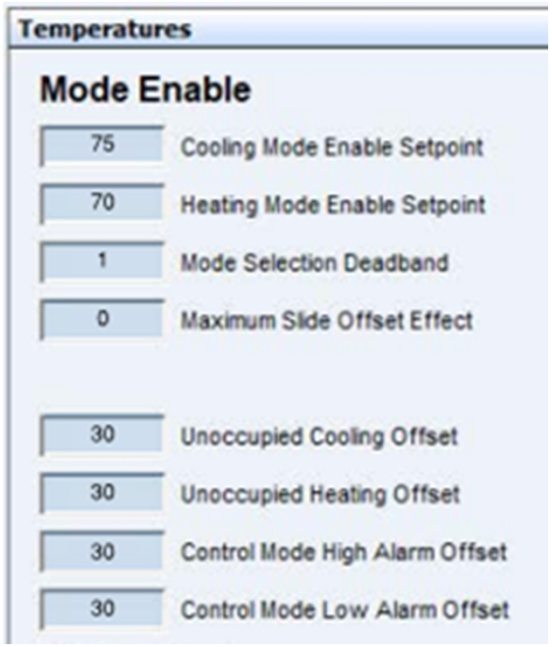


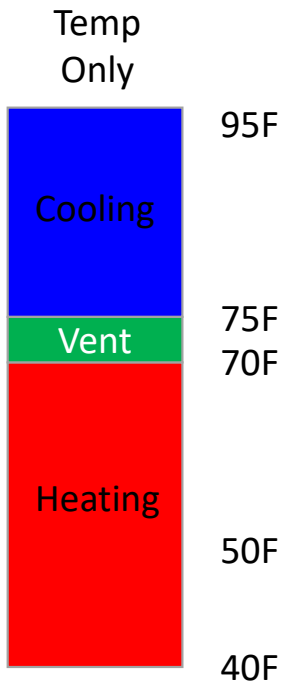


Ride the Psychrometric Roller Coaster

30 Offset = Off in Unoccupied

Prism 2 – Temperatures Mode Enable





Vent Mode to Cooling Mode

1. Temp Begins at 72F and Rises to 76F
2. Temp Increased above SP (75) + DB (1) = Cool (@76F)

Cooling Mode to Vent Mode

1. Temp Begins at 76F and Cools to 74F
2. Temp Decreased below SP (75) - DB (1) = Vent (@74F)

Vent Mode to Heating Mode

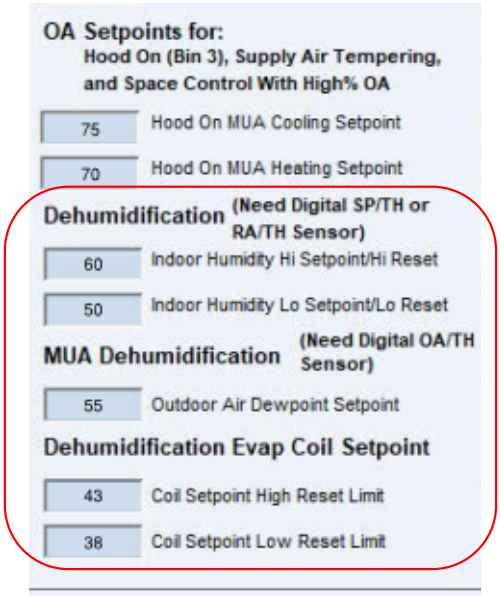
1. Temp Continues to drop to 69F
2. Temp Decreased below SP (70) - DB (1) = Heat (@69F)

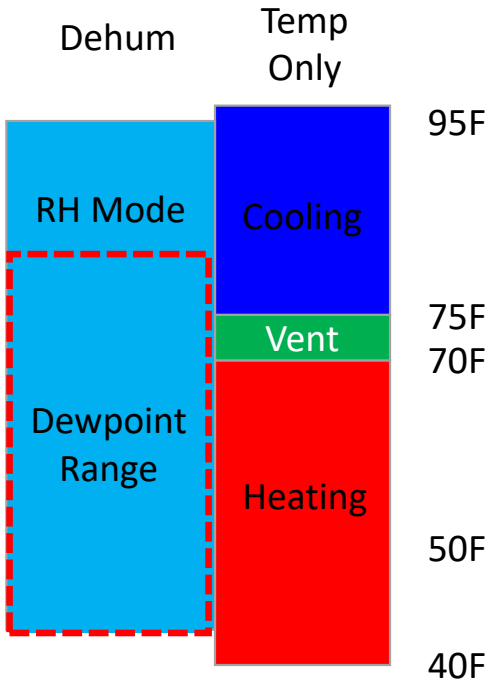
Heating Mode to Vent Mode

1. Temp at 69F begins to rise to 71F
2. Temp Increased above SP (70) + DB (1) = Heat (@71F)

** 30 Offset = Off in Unoccupied.*
Even at 30F, unit will not come on!

Prism 2 – Dehumidification Mode Added





RH Enables Above Hi Reset Setpoint & Turns Off at Low

- Cooling + RH
- Vent + RH
- Heating + RH

Coil Suction Temperature (% RH Control)

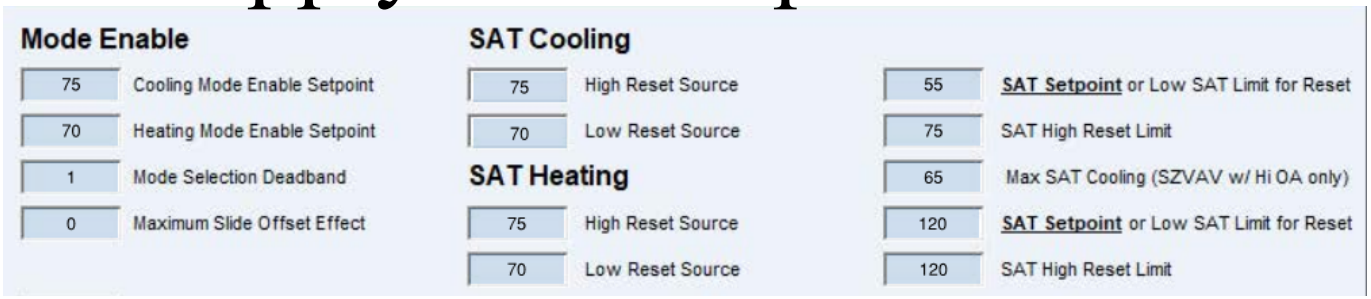
- Compressors Controls to Coil Setpoint
- At 60% or above, Coil setpoint is 38F
- As RH drops to 50%, Coil approaches 43F
- Below 50%, RH Mode Drops and Temp Only Control

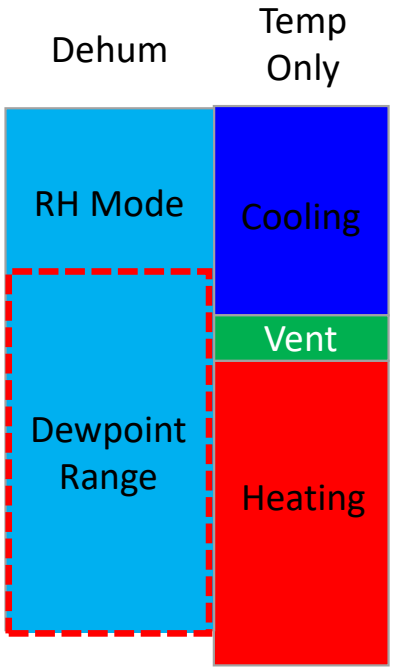
MAU / Outdoor Air Unit (Dewpoint Control)

RH Mode anytime Outdoor Dewpoint is above 55**F**

Requires RH Reading for CAV, Outdoor Air RH for MAU Control

Prism 2 – Supply Air Temp





<u>Assume No Reset, De-Humidification Control: Occupied Vent Mode Only</u>

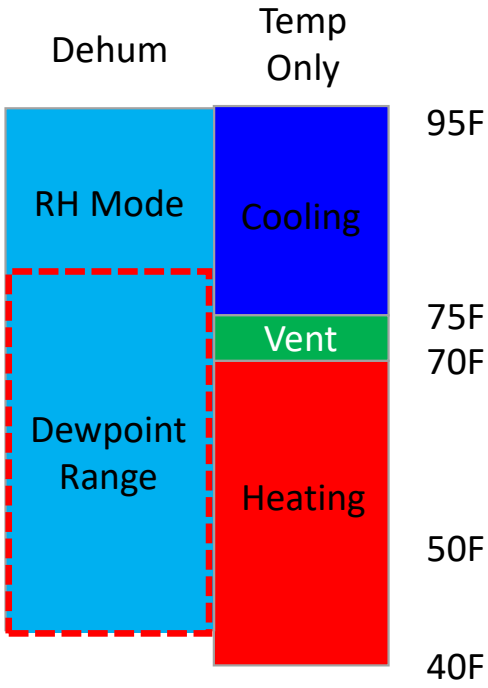
- Cooling Mode: SAT = 55F
- Cooling + RH: SAT = 55F
- Vent Mode: SAT = 72.5F
- Vent Mode + RH: SAT = 72.5F
- Heat Mode: SAT = 120F
- Heat Mode + RH: SAT = 120F

<u>Default Value Concerns</u>

- 55F SAT High Reset Limit needs to be raised when reset enabled
- 120F Heating Setpoint is too high. Suggest 90F as starting point
- Hot Gas Reheat not likely to get to 120F, Heat Mode + RH could subcool

Prism 2 – Supply Air Temp + Reset

Mode Enable		SAT Cooling			
75	Cooling Mode Enable Setpoint	75	High Reset Source	55	SAT Setpoint or Low SAT Limit for Reset
70	Heating Mode Enable Setpoint	70	Low Reset Source	75	SAT High Reset Limit
1	Mode Selection Deadband	SAT Heating		65	Max SAT Cooling (SZVAV w/ Hi OA only)
3	Maximum Slide Offset Effect	75	High Reset Source	60	SAT Setpoint or Low SAT Limit for Reset
		70	Low Reset Source	90	SAT High Reset Limit



Assume Space Reset, Occupied Vent Mode Only, High RH

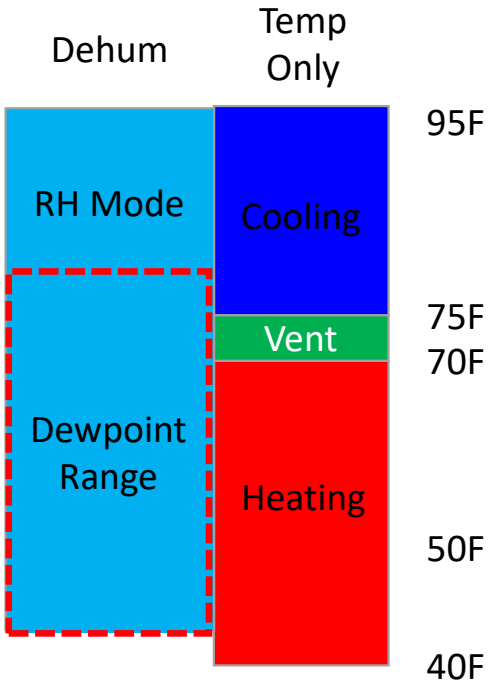
- Space Temp = 90F, Cooling Mode: SAT = 55F
- Space Temp = 78F, Cooling Mode: SAT = 55F
- Space Temp = 74.1F, Cooling + RH: SAT = 58.6F
- Space Temp = 73F, Vent Mode + RH: SAT = 72.5F
- Space Temp = 70.9F, Heat Mode + RH: SAT = 83.6F
- Space Temp = 68F, Heat Mode: SAT = 90F
- Space Temp = 50F, Heat Mode: SAT = 90F

Key Points

1) Vent Mode: SAT goes to ½ between Heating & Cooling Setpoints
2) Reset Source = Mode Enable isn't best way for Smooth SAT Reset

Prism 2 – Supply Air Temp + Reset

Mode Enable		SAT Cooling			
75	Cooling Mode Enable Setpoint	77	High Reset Source	55	SAT Setpoint or Low SAT Limit for Reset
70	Heating Mode Enable Setpoint	68	Low Reset Source	75	SAT High Reset Limit
1	Mode Selection Deadband	SAT Heating		65	Max SAT Cooling (SZVAV w/ Hi OA only)
3	Maximum Slide Offset Effect	75	High Reset Source	60	SAT Setpoint or Low SAT Limit for Reset
		70	Low Reset Source	90	SAT High Reset Limit



Assume Space Reset, Occupied Vent Mode Only, High RH

- Space Temp = 90F, Cooling Mode: SAT = 55F
- Space Temp = 75F, Cooling Mode: SAT = 59.4F
- Space Temp = 74.1F, Cooling + RH: SAT = 61.4F
- Space Temp = 73F, Vent Mode + RH: SAT = 72.5F

Key Points

1) Reset Greater than Mode Enable allows for Smoother SAT Control
2) Reset Source can be various inputs

Prism 2 – How to Choose Starting Setpoints

RN-070-3-0-EA09-3CB:A000-D0B-GDG-AF0-0DFB0BE-00-0000000VB

Tag: RTU# 2

Job Information

Job Name:	*Collins Aerospace*
Job Number:	*14587-STK21050*
Site Altitude:	*0 ft*
Refrigerant	*R-410A*

Static Pressure

External:	*1.50 in. wg.*
Evaporator:	*0.33 in. wg.*
Filters Clean:	*0.26 in. wg.*
Dirt Allowance	*0.35 in. wg.*

Cooling Section

	Gross	Net
Total Capacity:	*737.59*	*709.03 MBH*
Sensible Capacity:	*419.97*	*391.40 MBH*
Latent Capacity:	*317.62 MBH*	
Mixed Air Temp:	*79.30 °F DB*	*69.04 °F WB*
Entering Air Temp:	*78.30 °F DB*	*68.04 °F WB*
Lv Air Temp (Coil):	*49.13 °F DB*	*48.93 °F WB*
Lv Air Temp (Unit)	*51.06 °F DB*	*49.79 °F WB*
Digital Comp. Capacity Ratio:	*100%*	
Supply Air Fan:	*2 x 245D @ 5.11 BHP Ea.*	
SA Fan RPM / Width:	*1397 / 5.560"*	
Evaporator Coil:	*43.8 ft² / 6 Rows / 12 FPI*	
Evaporator Face Velocity:	*308.6 fpm*	

Unit Information

Approx. Op./Ship Weights:	*6386 / 6386 lbs. (±5%)*
Supply CFM/ESP:	*13500 / 1.5 in. wg.*
Pre-Filter FV / Qty:	*281.25 fpm / 24*
Final Filter FV / Qty:	*281.25 fpm / 24*
Outside CFM:	*4050*
Ambient Temperature:	*93 °F DB / 78 °F WB*
Return Temperature:	*72 °F DB / 63 °F WB*
Economizer:	*0.13 in. wg.*
Heating:	*0.08 in. wg.*
Cabinet:	*0.14 in. wg.*
Re-Heat Coil:	*0.04 in. wg.*
Total:	*2.83 in. wg.*

Heating Section

PreHeat Type:	*Std (No Preheat)*
Heating Type:	*Nat. Gas Heat*
Heating CFM:	*8700*
Total Capacity:	*432.0 MBH*
OA Temp:	*15.0 °F DB / 14.0 °F WB*
RA Temp:	*68.0 °F DB / 54.0 °F WB*
Entering Air Temp:	*43.3 °F DB / 38.2 °F WB*
Leaving Air Temp:	*89.3 °F DB / 58.9 °F WB*
Input:	*540.0 MBH*
Heater Qty:	*1*
Consumption:	*540.0 MBH*
Total Turndown Ratio:	*10:1*

Re-Heat Coil:

Capacity:	*333 MBH*
LA DB / WB:	*72.00 °F / 58.35 °F*
RH:	*44%*

Key Points

1) Obtain Rating Page and/or Know Application
2) Unit Capable of Setpoints?
3) Review Airflows
   - 13,500 cfm Total
   - 4,050 cfm O/A (30%)
   - Coil Face Velocity 308 fpm
4) Review Cooling Temps
   - O/A Temp = 93/78
   - R/A Temp = 72/63
   - LCT = 49.13/48.93
   - Reheat Temp = 72F
   - Reheat Supply RH = 44%
5) Review Heating Temps
   - O/A Temp = 15/14
   - R/A Temp = 68/54
   - Supply Temp = 89.3F

Prism 2 – Starting Configuration

Key Points

1) Obtain Rating Page and/or Know Application
2) Unit Capable of Setpoints?
3) Review Airflows
   - 13,500 cfm Total
   - 4,050 cfm O/A (30%)
   - Coil Face Velocity 308 fpm
4) Review Cooling Temps
   - O/A Temp = 93/78
   - R/A Temp = 72/63
   - LCT = 49.13/48.93
   - Reheat Temp = 72F
   - Reheat Supply RH = 44%
5) Review Heating Temps
   - O/A Temp = 15/14
   - R/A Temp = 68/54
   - Supply Temp = 89.3F

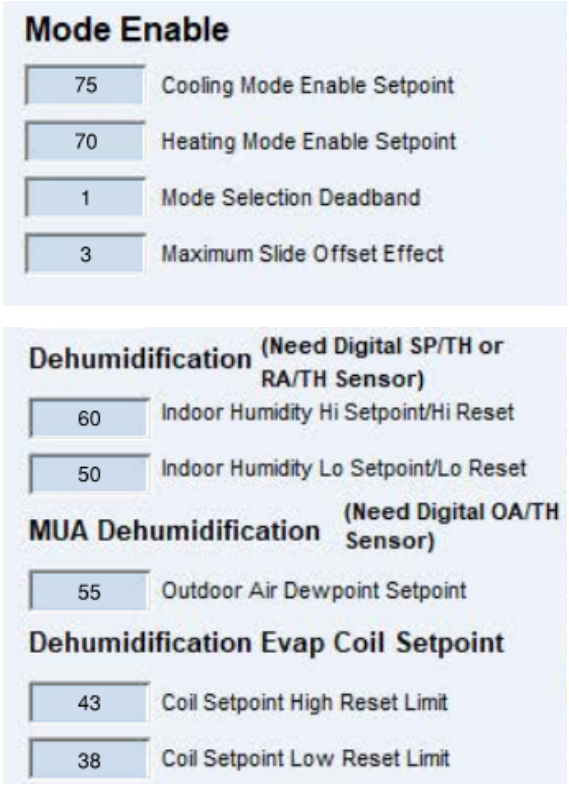
Configuration Thoughts

1) HVAC Mode: If it has Space Temp Sensor, there is 30% O/A, so we start at MAU. Other Potential is CAV.
2) Coil Temperatures and Supply Temperatures are low so this appears to be a low dewpoint application.
3) Supply RH at 72F is down around 44%. Set space RH at ~ 5% above
4) Coil Leaving Temp at 49F, I set Coil Temp at 10-15F lower as starting place.
5) Unit has a Digital Scroll compressor and should offer flexibility of control on the coil temp.
6) Reset Source: Temperature Resets help tuning process and stabilized SAT along with Stable Control. Add some offset for SAT to minimize swings.
7) Unit has 10:1 turndown on Gas Heater. That will offer semi-stable supply temperatures when setup correctly.

Prism 2 – Starting Setpoints

Key Points

1) Obtain Rating Page and/or Know Application
2) Unit Capable of Setpoints?
3) Review Airflows
   - 13,500 cfm Total
   - 4,050 cfm O/A (30%)
   - Coil Face Velocity 308 fpm
4) Review Cooling Temps
   - O/A Temp = 93/78
   - R/A Temp = 72/63
   - LCT = 49.13/48.93
   - Reheat Temp = 72F
   - Reheat Supply RH = 44%
5) Review Heating Temps
   - O/A Temp = 15/14
   - R/A Temp = 68/54
   - Supply Temp = 89.3F



Based on Rating Page

- Cooling Mode: 62F
- Heating Mode: 58F
- Deadband: 1F

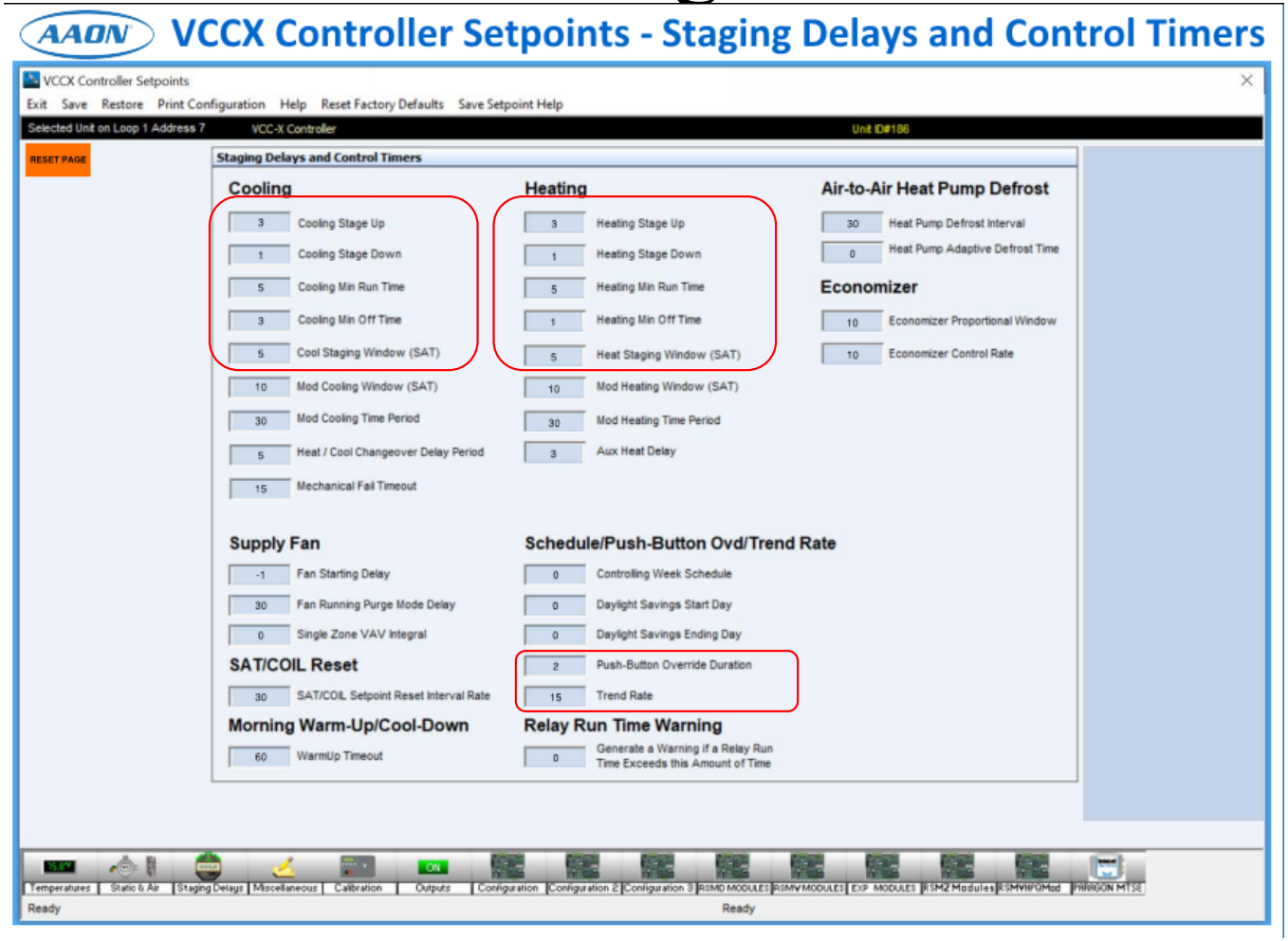
- RH High Setpoint: 50%
- RH Low Setpoint: 40%

- Outdoor Air Dewpoint: 45F

- Coil High Reset: 38F
- Coil Low Reset: 35F

Set Mode around Desired Control Temperature as long as unit sized appropriately

Prism 2 – Tuning



Tuning

- Adjust Trend Rate and Log
- Look for Stable SAT
- Review Cycling on/off
- Review Staging up and down
- Increase Staging Windows – Slowly at times on heating

DISCUSSION

Q&A

THANK YOU!